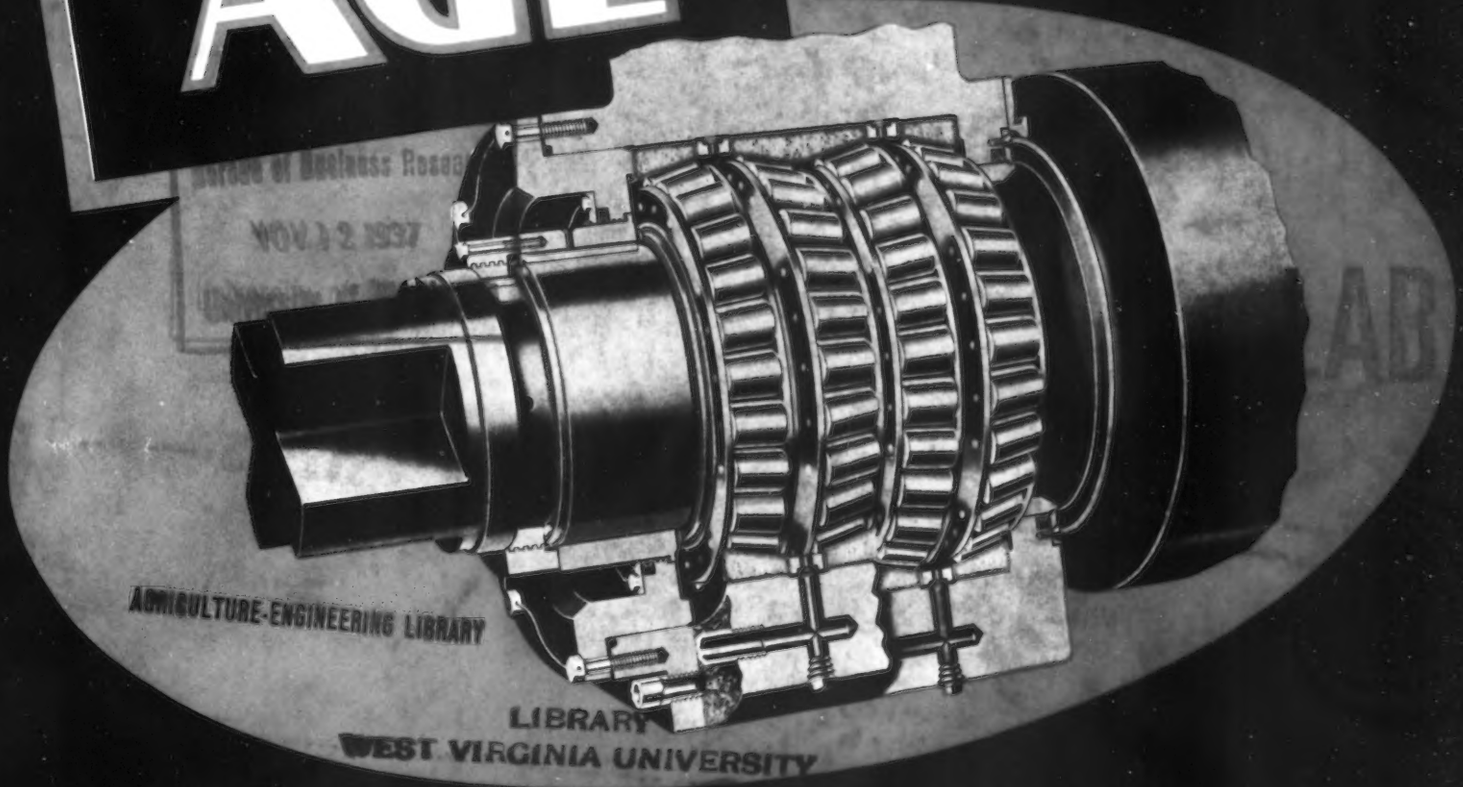
NOVEMBER 11, 1937

THE IRON AGE

THERE IS NO SHORT CUT TO EXPERIENCE

★



AGRICULTURE-ENGINEERING LIBRARY
LIBRARY
WEST VIRGINIA UNIVERSITY

8 Budd-built Zephyrs are now rolling on TIMKEN Bearings.
Glide — as you ride a Timken-equipped Train

Nobody knows the value of experience better than the steel manufacturer—and nobody is more respectful of it.

Experience is one thing that cannot be imitated. There is no short cut to it, neither is there any substitute for it. It is a sure guide to performance in the selection of any product. For example, the things we have learned about roll neck bearings during 17 years of manufacturing and applying them are priceless to us and to rolling mill operators. They cannot be acquired as easily as the appearance of a bearing can be duplicated.

That is one important reason why the trade mark "TIMKEN" stands for unequalled service wherever roll neck bearings are used.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN
TAPERED ROLLER BEARINGS

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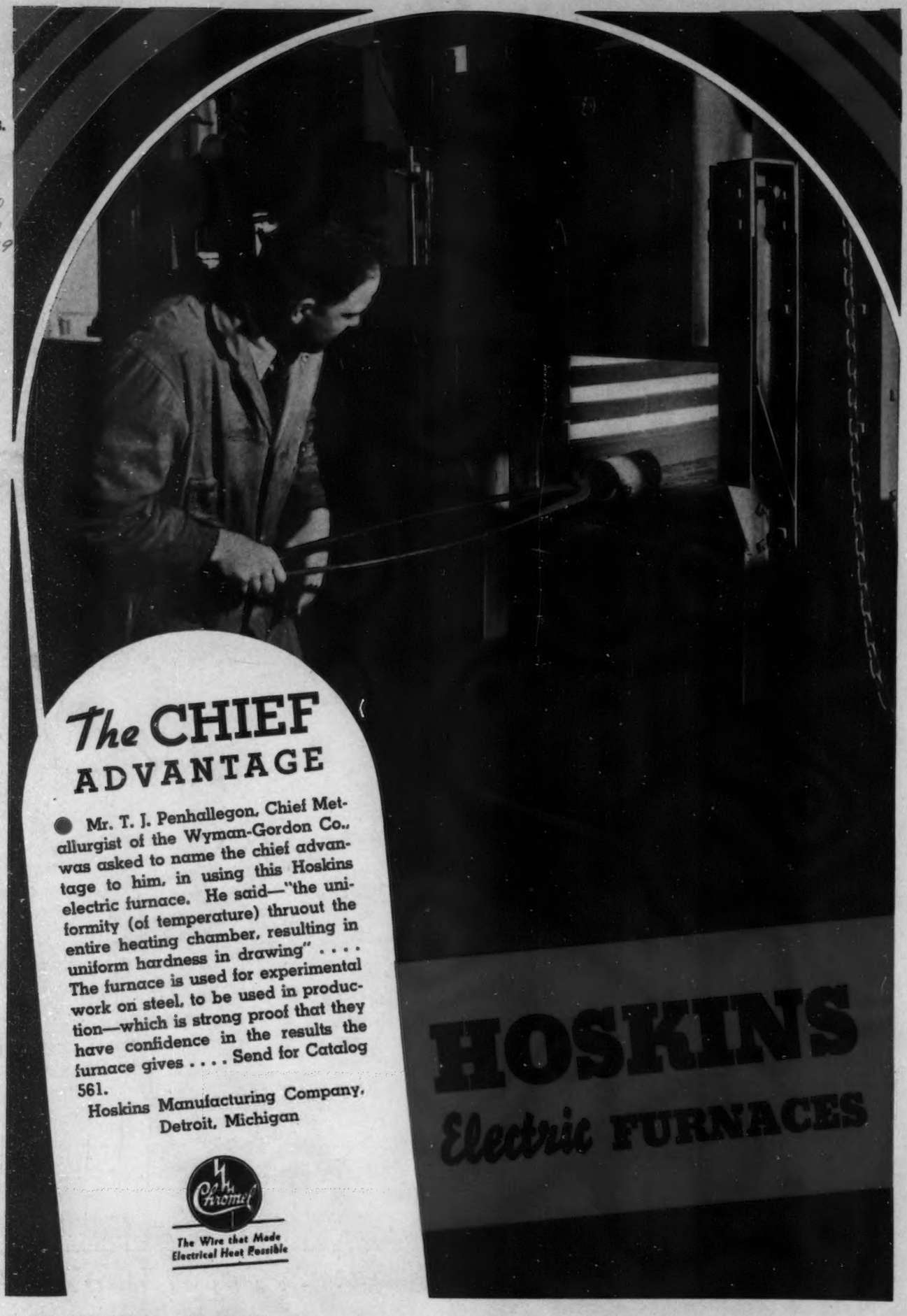


The CHIEF ADVANTAGE

● Mr. T. J. Penhallegon, Chief Metallurgist of the Wyman-Gordon Co., was asked to name the chief advantage to him, in using this Hoskins electric furnace. He said—"the uniformity (of temperature) thruout the entire heating chamber, resulting in uniform hardness in drawing" .... The furnace is used for experimental work on steel, to be used in production—which is strong proof that they have confidence in the results the furnace gives .... Send for Catalog 561.

Hoskins Manufacturing Company,
Detroit, Michigan

HOSKINS
Electric **FURNACES**

Ch Chromel
The Wire that Made Electrical Heat Possible

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Publication Office, Chestnut & 56th Sts., Philadelphia, Pa. Editorial and Executive Offices, 239 W. 39th St., New York, N. Y. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. $6.00 a year in U. S., Canada $8.50, Foreign $12.00. Vol. 140, No. 20.

Wire Rope and Strand

now products of Bethlehem

WITH the recently-announced acquisition of Williamsport Wire Rope Company by Bethlehem Steel Company, Bethlehem becomes a manufacturer of wire rope and strand.

For years the name Williamsport has been identified with dependable wire rope and strand. Not only to men who have been using Williamsport products, but to all other wire rope and strand users, Bethlehem's entry into this field marks an important forward step.

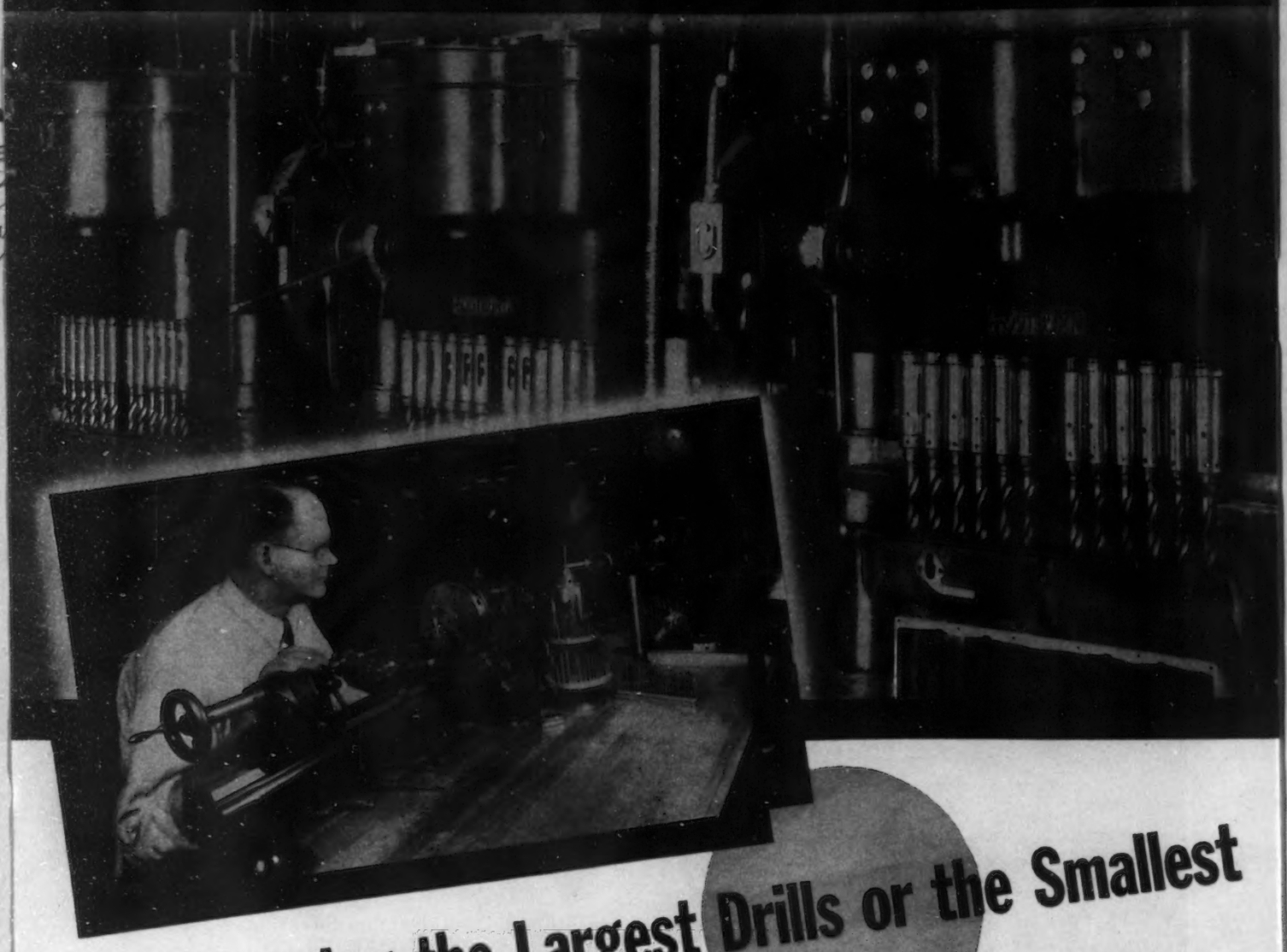
As Williamsport Wire Rope becomes Bethlehem Wire Rope, customers of Williamsport Wire Rope Company can look with assurance to Bethlehem to maintain the quality standards associated with Williamsport products. Advantages to the user may naturally be expected to accrue from the broader manufacturing and servicing facilities offered by the Bethlehem organization.

Customers of Bethlehem Steel Company can now obtain a complete line of wire rope and strand from the same source which furnishes their other steel requirements, and made to the same quality standards as those that govern in the manufacture of Bethlehem alloy and tool steels, plates, sheets, and other products.

Wherever and however you use wire rope and strand you will find Bethlehem a source of well-made, dependable material, serviced by men whose long, first-hand experience in analyzing and solving wire-rope problems is a background for authoritative recommendations on the most suitable grade of Bethlehem Wire Rope for any task.

BETHLEHEM STEEL COMPANY

TRUST "Cleveland's" PRECISION AND UNIFORMITY



Whether using the Largest Drills or the Smallest

• A whole pageful of type couldn't go as far as these pictures do in stressing two vital facts that every buyer should remember about "Cleveland" Twist Drills and Reamers:

1—This Company makes all sizes and types of tools used in commercial drilling and reaming. "Cleveland" then is the logical place at which to concentrate all of your buying.

2—Production methods in the "Cleveland" plant bring experimental-department accuracy and precision into mass manufacturing. Steady increases in business have forced continual expansion of plant—a major construction project is now nearing completion.

But the established high quality and reliable performances of "Cleveland" Twist Drills and Reamers remain unchanged, regardless of all increases in production volume.

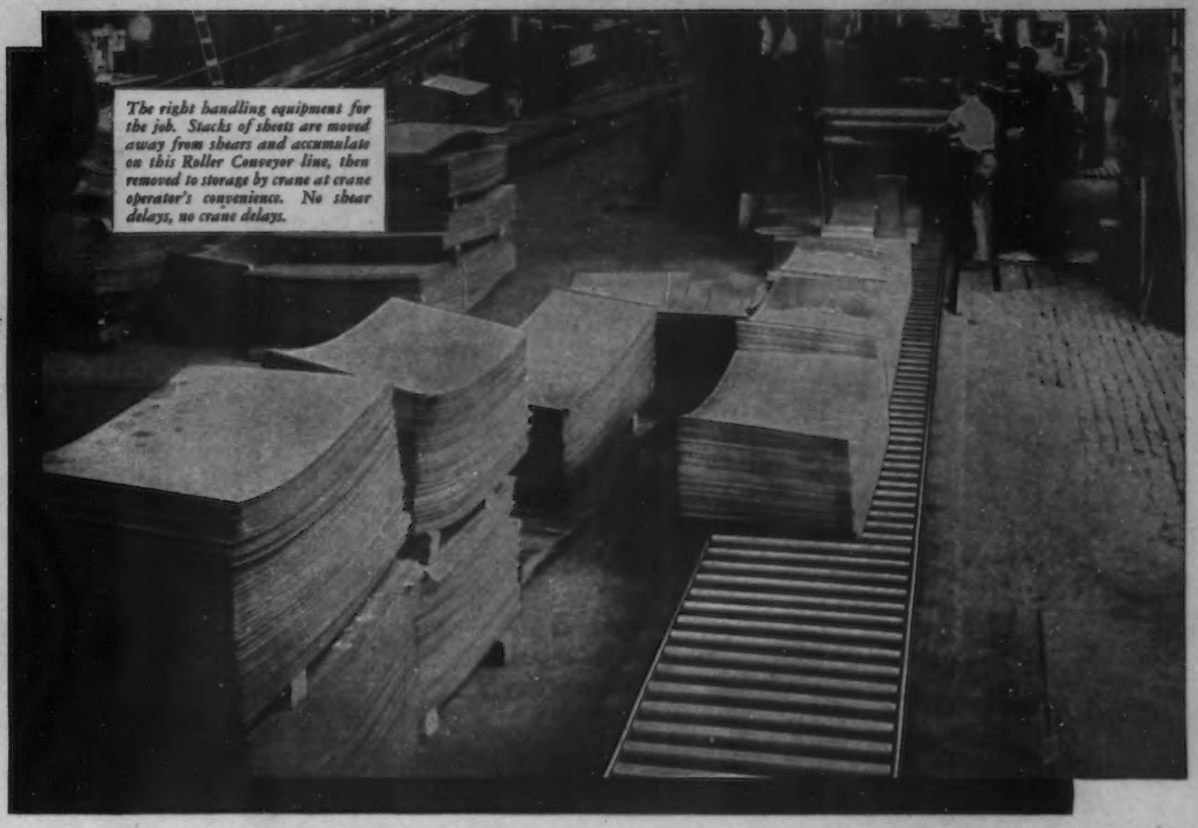
Counseling facilities of the whole "Cleveland" Staff are at your disposal, and inquiries will be given prompt, interested attention. Address the Cleveland plant, our nearest Stockroom, or your closest source of supply.

The CLEVELAND TWIST DRILL COMPANY
1242 EAST 49th STREET
CLEVELAND

TRADE MARK REG. U S PAT OFF AND FOREIGN COUNTRIES

30 READE ST. NEW YORK 9 NORTH JEFFERSON ST. CHICAGO 654 HOWARD ST. SAN FRANCISCO
6515 SECOND BLVD., DETROIT LONDON - E. P. BARRUS, LTD. - 35-36-37 UPPER THAMES ST., E.C.4

"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU



The right handling equipment for the job. Stacks of sheets are moved away from shears and accumulate on this Roller Conveyor line, then removed to storage by crane at crane operator's convenience. No shear delays, no crane delays.

The MOST PRACTICAL EQUIPMENT for the purpose

★Selecting the type of equipment *best suited* for each handling operation is an important factor in promoting mill efficiency. . . More and more, gravity and power conveyors have won their way into use in the mill, for dozens of handling jobs, *because they do these jobs better, quicker, more economically* than other types of equipment. Former methods for accomplishing the same results are as obsolete today as a model T Ford. . . Logan engineers have contributed a substantial share in adapting conveyors to the exacting needs of steel mill service. And if it's a conveying problem you have in mind now, the nearest Logan representative will be glad to call. Or write, on your letterhead, for Bulletin 10.

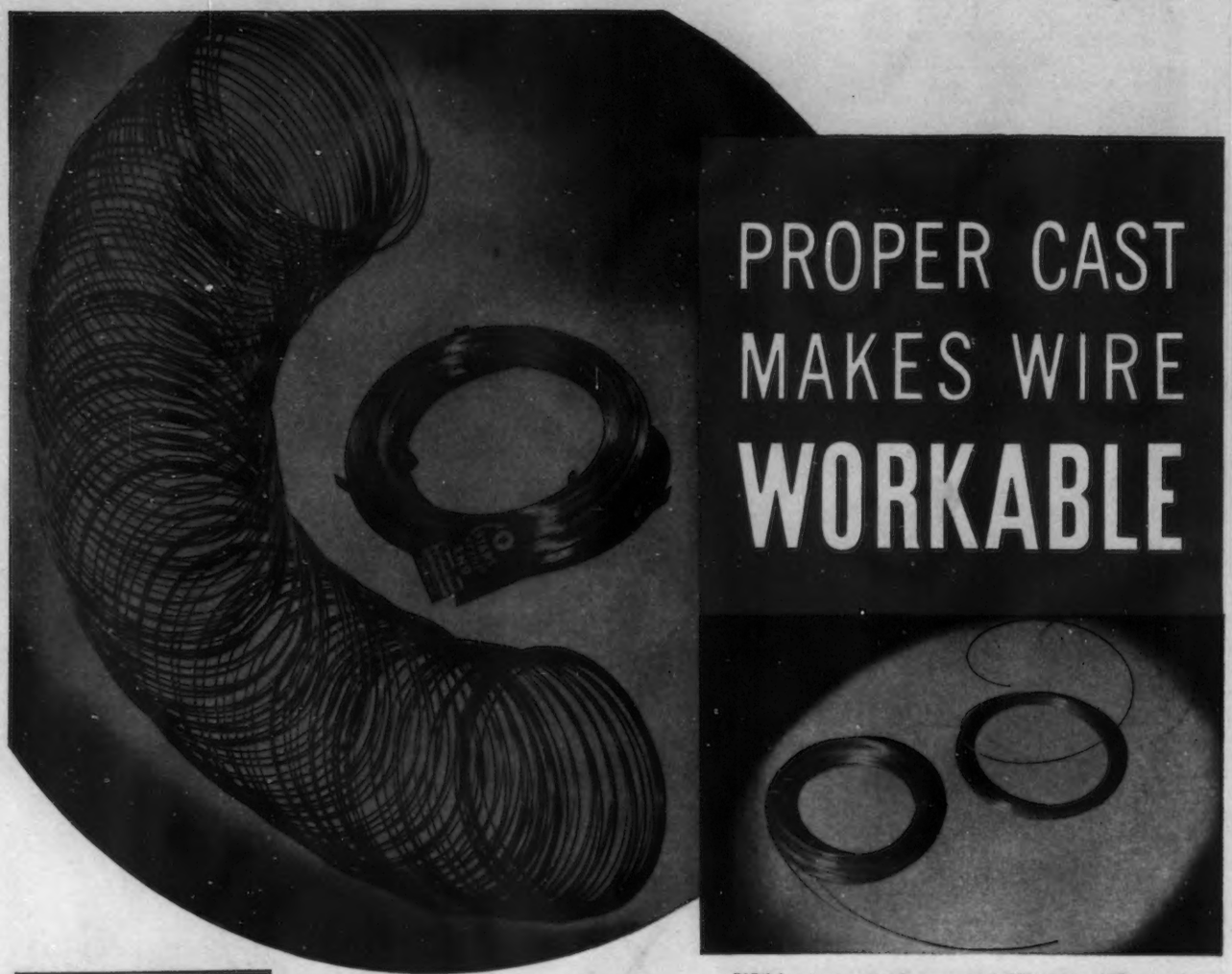
A Roller Conveyor storage line for coils ahead of continuous pickler.

LOGAN CO., Incorporated, Louisville, Ky.
545 Buchanan St.

MOVING IS 90% OF MAKING

Logan Conveyors

LOUISVILLE



PROPER CAST MAKES WIRE WORKABLE

Wild wire spreads upward. Wire straightened-in-coil is without this tendency and will tend to straighten in the plane of the bundle when freed.

This in a series of advertisements designed to help you make a better selection of wire for maximum value per unit of cost.

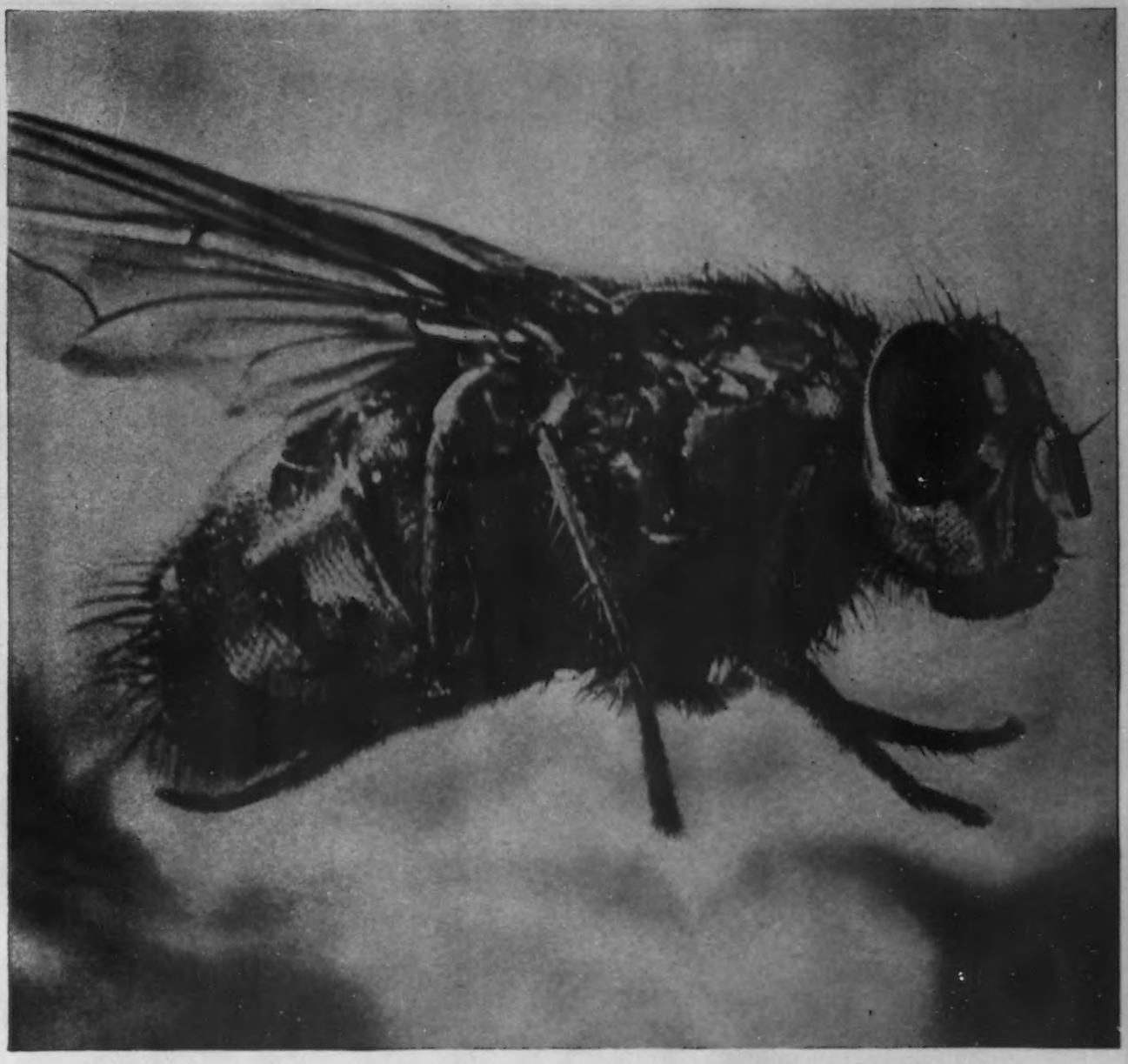
ONE of the most frequently occurring and troublesome defects of wire and one that is often unrecognized, is improper cast *(wild wire)*. Properly killed round wire may be spread in coils (see illustration above) without any of the loops showing a tendency to rise from the horizontal plane. With proper cast wire, the spring maker can produce his finished products of uniform diameter and length. Wire fabricators find that cut lengths of crimped wires will lie flat, wire forms are true to shape... cast makes the difference between easy and hard working wire. In the Wickwire Spencer Mills cast is recognized as an important physical property. Every care is exercised that the dies are kept in alignment with drawing blocks. Thus the primary cause of improper cast is eliminated.

WICKWIRE SPENCER STEEL COMPANY

New York City, Buffalo, Chicago, Detroit, Worcester. Pacific Coast Headquarters: San Francisco. Warehouses: Los Angeles, Seattle, Portland. Export Sales Dept.: New York

Wickwire Spencer manufactures High and Low Carbon Wires—In various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire — Valve Spring — Music — Clip — Pin — Hairpin—Hook and Eye—Broom—Stapling—Bookbinding—Dent Spacer Wire — Reed Wire — Clock — Pinion — Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

Wissco Wire
by Wickwire Spencer



Rubber—like sugar—catches more flies

A typical example of Goodrich product development

YOU remember the old saying—"Sugar catches more flies than vinegar." Catching flies is the job of Tanglefoot Company, makers of fly paper, so when they heard that a foreign product caught more flies than their own, they investigated and found the reason—rubber was part of the sticky material. But the method of using the rubber was a carefully guarded foreign secret.

Tanglefoot came to Goodrich with the problem. A Goodrich technical man went to work, developed a formula equal in every way to the foreign product, and then even helped Tanglefoot find the machinery needed for mixing the new ingredients.

With the Goodrich formula, the new Tanglefoot paper actually catches more flies, does not dry out, and ages so much more slowly that it lasts several times longer than any material used before. As a natural result, sales mounted.

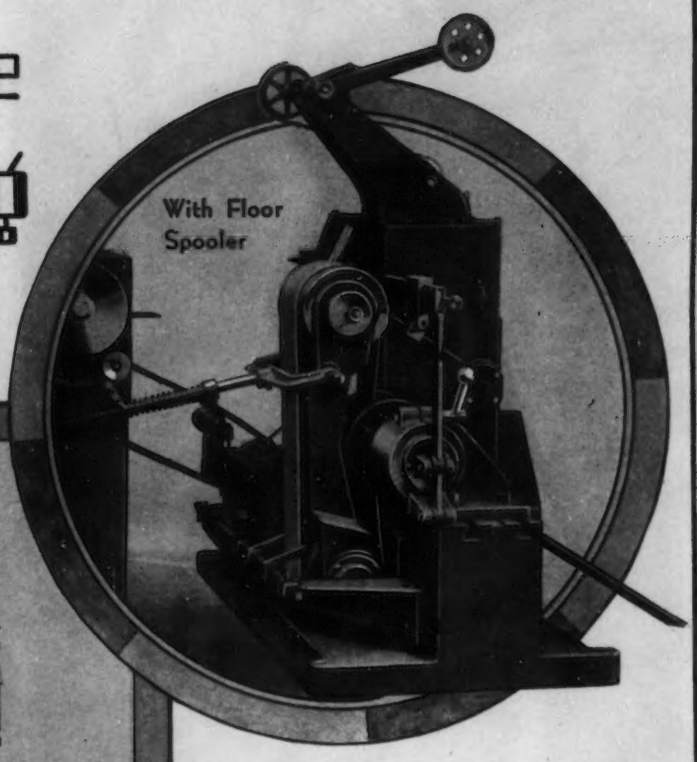
Remember this, next time you buy anything made of rubber. Goodrich research is continuous. Applied to new problems it has developed tanks which hold even the most violent acids, rubber compounds so resistant to abrasion that they outwear steel 10 to 1, rubber colors and forms so attractive that they add new sales appeals to countless products. This same continuous research is also applied to standard products, with the result that Goodrich belting, hose and packing last far longer than used to be thought possible, and stand abuse and heats that would have ruined rubber a few years ago. Next time you buy mechanical rubber goods specify Goodrich, and save money. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

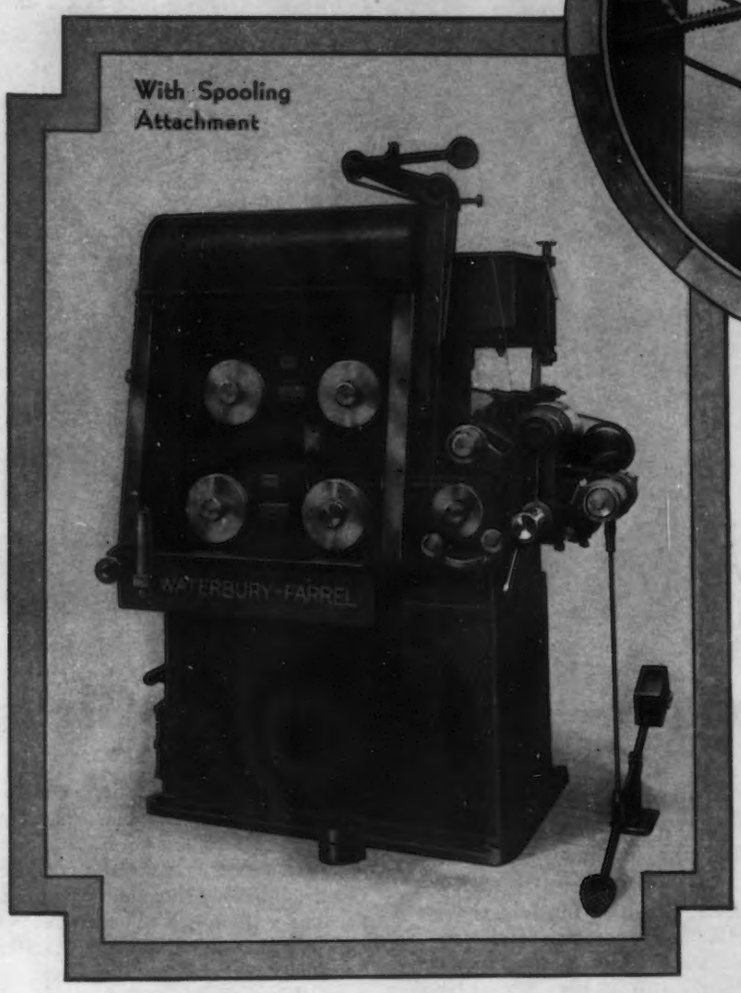
Goodrich

ALL *products problems* IN RUBBER

Waterbury-Farrel

Upright Cone Wire Drawing Machines...





The Waterbury Farrel Foundry and Machine Co.

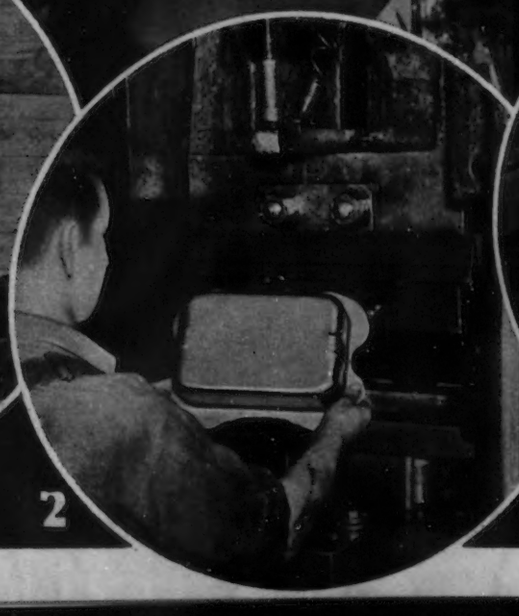
HOME OFFICE AND WORKS: Bank and Meadow Sts., Waterbury, Connecticut

CLEVELAND CHICAGO NEWARK, N. J.

RANGE and POWER
No bolted assembly is correctly designed *unless* it includes Helical Spring Washers....*adequate both in range and power* to keep parts tight.
SPRING WASHER INDUSTRY
ONLY A HELICAL SPRING WASHER HAS ADEQUATE RANGE OF

Where was YOUR product w

1


2

3

when the Cash Register RANG?

Did it go out with the Customer or back on the shelf?

COST, design, and appearance are the important factors that lead customers into buying some manufactured products and rejecting others.

Products fabricated from American Quality Cold Rolled Strip Steel have the smooth eye-appealing finish that helps move merchandise off the dealers' shelves and counters. It helps keep prices within the range of your customers' pocketbooks, too. For its cost is much lower than some of the more expensive metals. The ease with which it can be fabricated will reduce your rejections and wasted metal to a minimum.

Perhaps you can find a means for improving your own product at worth while savings through the use of American Quality Cold Rolled Strip Steel. Our sales representatives will be glad to offer you assistance in the application of cold rolled strip steel to your needs.

American Quality Cold Rolled Strip Steel is uniformly rolled from the finest materials. It is made in a complete range of widths, edges, tempers and finishes and is available in coils or in cut lengths according to your requirements. An investigation of the advantages and economies in the use of cold rolled strip steel may help you improve your products and reduce your manufacturing costs.

U·S·S AMERICAN QUALITY COLD ROLLED STRIP STEEL

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY, San Francisco
Pacific Coast Distributors

UNITED STATES STEEL PRODUCTS CO., New York
Export Distributors

1. Whether you order American Quality Cold Rolled Strip Steel a few coils at a time or in carload lots you are sure of getting the same high quality. Every coil of our Cold Rolled Strip Steel is subjected to rigid laboratory examinations to prove that its quality is all that we claim it to be.

2. Deep draws present no problems to our Cold Rolled Strip Steel. Here is a typical example of the way in which American Quality Cold Rolled Strip Steel simplifies deep drawing problems.

3. Temper, an important property of strip steel, is meaningless except when accurately controlled and defined. Sensitive Rockwell hardness determinations are therefore part of the rigid control applied to American Quality Cold Rolled Strip Steel.

4. The variety of products which lend themselves easily to fabrication from American Quality Cold Rolled Strip Steel is without limit. An investigation of your own products may point out how you can make them better and more economical by fabricating them wholly or in part from American Quality Cold Rolled Strip Steel.

UNITED STATES STEEL

FOR HIGH PRODUCTION AND PRECISION WORK

INQUIRE ABOUT

BAIRD AUTOMATICS—

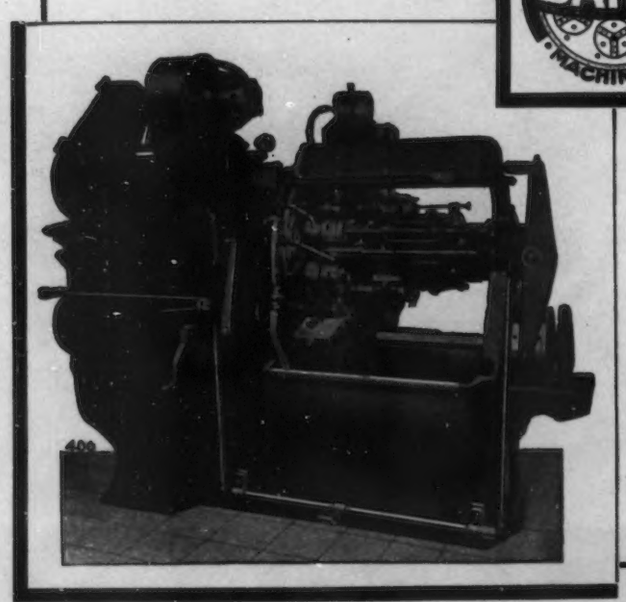
SINGLE SPINDLE VERTICALS

MULTIPLE SPINDLE VERTICALS

MULTIPLE SPINDLE HORIZONTALS

CONTINUOUS AND INDEXING
LATHES, CHUCKING MACHINES, GRINDERS

SPECIAL BUILT TO ORDER, HIGH PRODUCTION AND MULTIPLE OPERATION MACHINES.



Save by Accurate Machining

"Ask Baird About It"

THE BAIRD MACHINE COMPANY
BRIDGEPORT, CONN.

Westinghouse motors give more "mileage" too!

They have

DUAL · PROTECTED WINDINGS

WITH TAPED END · TURNS

● Westinghouse Motor windings are protected *both* ELECTRICALLY and MECHANICALLY. Slot portions are given mechanical and dielectric strength to resist electrical breakdowns by a combination slot-cell, and *end-turns are individually taped.* Perfect *electrical* insulation is assured by process-controlled impregnation treatments with the highest-grade varnishes obtainable.

Added to this, Westinghouse, and Westinghouse *alone*, combines SEALED SLEEVE BEARINGS and rigid ONE-PIECE FRAMES. When you buy electric motors, demand these three features and you'll make sure of getting More Motor Mileage. Call your nearest:

WESTINGHOUSE OFFICE
INDUSTRIAL AGENT

ELECTRICAL WHOLESALER
MOTOR DEALER

Westinghouse Electric, East Pittsburgh, Pa.

J 20322

FROM ENGINEERING TABLE TO DRIVEN MACHINERY

Specify **Westinghouse**

UNDIVIDED RESPONSIBILITY MULTIPLIES THE VALUE of WESTINGHOUSE SERVICE

Proving Again...

THAT GRADE SEPARATIONS CAN ADD TO CIVIC BEAUTY

THE McMILLAN STREET BRIDGE, *Cincinnati, was built by the Highway Department of the City of Cincinnati, under the direction of H. H. Kraux, Engineer of Highways. The Kerpen Construction Company of Cincinnati were the general contractors. Steel fabricated by American Bridge.*

THE BENTS *are spaced 16 feet on centers and carry a 44 foot concrete deck roadway and 2 sidewalks, each 6 feet 8 inches wide.*

HAPPILY, engineers have long since disproved that civic beauty is disturbed by the practical utility of grade separations. The pleasing, vaulted arch profile of the new McMillan Street Bridge over Reading Road, Cincinnati, is an interesting example. This bridge is made up of four rigid frame girder and column bents that are braced by a series of transverse portals. Each bent has a center span of 117 feet between column centers and one cantilever span at each end 50 feet long. The total length of the bridge is 217 feet.

All structural steel was fabricated at our Ambridge plant, strategically located on the Ohio River for either water or rail transportation. Backed by an accumulated experience of a half century, American Bridge offers facilities and service to meet any requirements in fabricated steel construction anywhere, anytime.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

Increase your profits with J&L STEEL

Rejects reduced 93%

Good reason for a change to J&L STEEL

The scrap bins were too full. Rejects totaled 14%. Jones & Laughlin Steel was tried. Rejects were found to run below 1% . . . a reduction of 93% . . . and a change to J&L was immediately made.

Results have been permanent . . . production costs have dropped . . . and profits have increased.

Many other plants are similarly profiting through adopting J&L as their steel source. They, too, get extra advantages . . . fewer rejects . . . extra savings . . . and more sales.

The Jones & Laughlin Technical Staff is available to help you select the *right* grade of steel to fit *your* requirements.

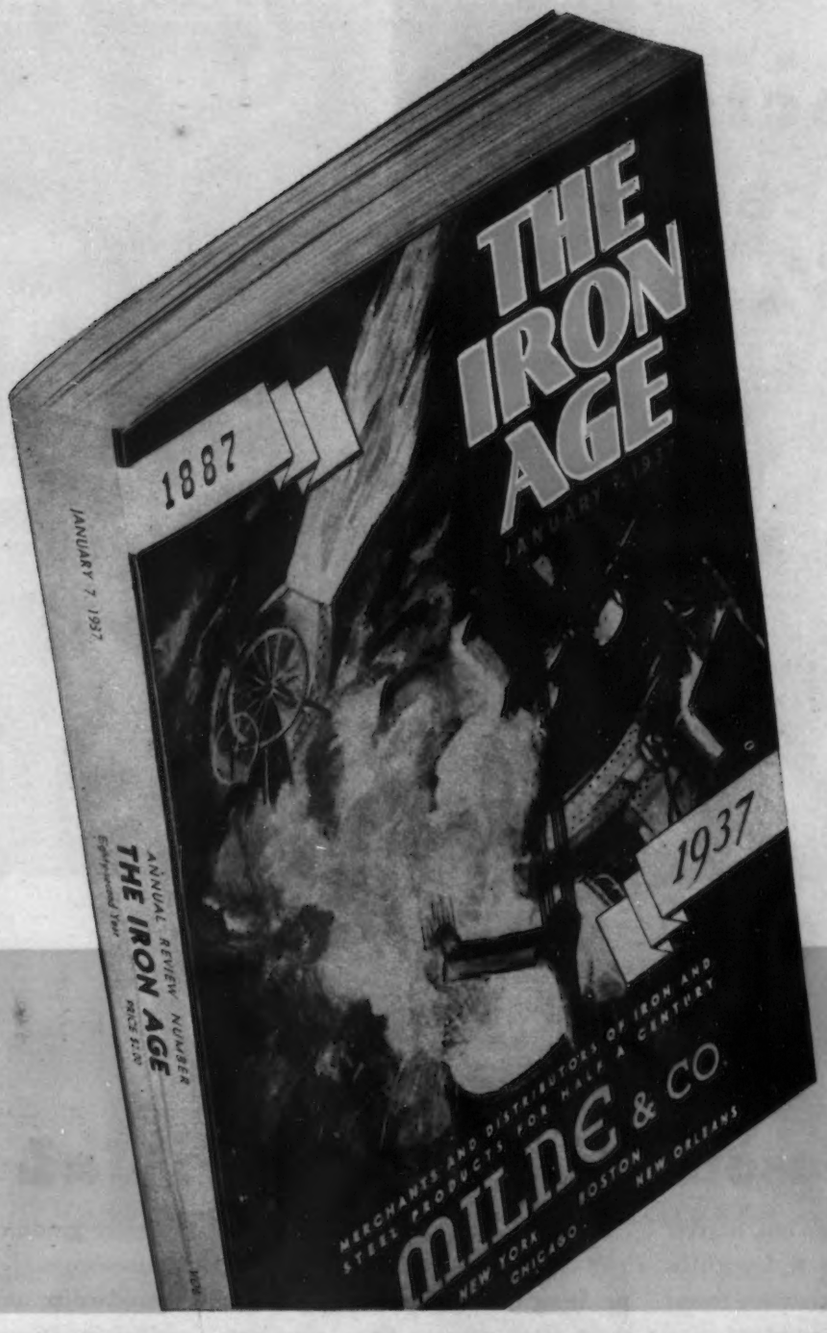
Standardize on J&L . . . for steel *and* service. Get dependable manufacturing at low cost . . . and give your customers higher quality. See your Jones & Laughlin representative . . . or write . . . today.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

MAKERS OF HIGH QUALITY IRON AND STEEL PRODUCTS SINCE 1850

J&L PRODUCTS: Hot Rolled Bars, Plates and Shapes · Lightweight Channels · Junior Beams · Bars for Concrete Reinforcement · Railroad Spikes and Tie Plates · Steel Piling · Hot and Cold Rolled Strip and Sheets · Flat Galvanized Sheets · Galvanized Roofing and Siding · Cold Finished Bars and Shapes · Wire Rods and Wire Products · Seamless & Welded Tubular Products · Tin Plate, Black Sheets and Manufacturing Ternes · Fabricated Structural Work · Coke By-Products



THE IRON AGE ANNUAL WILL BE OUT

JANUARY 6, 1938

RESERVATIONS

for space are now being taken for

...THE ANNUAL REVIEW NUMBER of THE IRON AGE

A big advance sale has already been made. Will you advise what space we should reserve for you?

"Barnes-made" SPRING APPLICATIONS

Automotive Equipment

Air Brakes
Anti Rattlers
Auto Bodies
Brakes
Brake Bands
Brake Rods
Brake Shoes
Carburetors
Clutch
Curtains
Generators
Grease Cups
Head Lights
Hood Hooks
Horns
Ignitions
Mufflers
Odometers
Oil Cups
Shock Absorbers
Speedometers
Stabilators
Starters
Stop Lights
Tail Lights
Timers
Tire Connections
Transmissions
Valves
Windows

Aviation

Aeronautical Equipment
Antennae Reels
Brakes
Carburetors
Clutch
Fuel Pumps
Ignitions
Oleo Strut Shock Absorbers
Parachutes
Push Rods
Starting Equipment
Super Chargers
Tail Skids
Valves
Variable Speed Propellors

Diesel Equipment

as developed and in process of development

Electrical Appliances

Brushes
Cords
Curling Irons
Curling Iron Holders
Electric Light Sockets
Electric Light Switches
Electric Light Switch Washers
Heaters
Irons
Motors
Pneumatic Tools
Pneumatic Tool Clips
Telephones
Toasters
Vacuum Cleaners
Vibrators
Washing Machines

Furniture

Cabinet Fil
Chairs
Desks
Di
acks

Machinery, Miscellaneous

Bread Machinery
Can Opening Machines
Drills
Drill Presses
Floor Surfacing Machines
Knitting Machinery
Moving Picture Machines
Shoe Machinery

Miscellaneous

Berths
Bicycles
Bicycle Bells
Bicycle Brakes
Bicycle Pants Guards
Bracelets
Cameras
Cars
Car Windows
Cigarette Cases
Clocks
Door Checks
Elevators

Exercisers
Fare Registers
Fire Extinguishers (Small Parts)
Fire Extinguishers
Gas Cocks
Gas Engines
Gas Heater Washers
Gas Meters
Gong Bells
Governors
Guns
Hair Curlers
Headbands
Heat Regulators
Hinges
Implements
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Levers
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Pumps
Pump Valves
Punches
Sashes
Scales
Sewing Machines
Shade Rollers
Shears
Spray Guns
Steam Pumps
Stethoscopes
Surgical Instruments
Suspenders
Taximeters
Ticket Punches
Toys
Trolleys
Trolley Catchers
Trusses
Truss Attachments
Vibrators
Window
Window Screens
Window Screen Lifts
Window Shades
Wrenches
Wrench Washers

Musical Instruments

Automatic Pianos
Bellows
Cornets
Horns
Organs
Phonographs
Pianos
Player Pianos
Saxophones
Traps

ice Appliances

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Auto Calls
Cabinets and Files
Cash Registers
Check Protectors
Comptometers
Dictaphones
Drawing Instruments
Envelope Sealers
Loose Leaf Books
Mailing Machines
Numbering Machines
Stamp Affixers
Staplers
Time Clocks
Time Locks
Time Recorders
Typewriters

Radio

Battery Clip Parts
Binding Posts
Jacks
Plugs
Springs
Spring Washers
Stampings

Textile Machinery

Bobbin Rings
Card Repeaters
Dobbies
Head Motions
Looms
Lubrication
Picker Sticks
Reversing Mechanisms
Shuttles

What's Yours?

THE WALLACE BARNES CO., Bristol, Connecticut
DIVISION OF ASSOCIATED SPRING CORPORATION
SPRINGMAKERS FOR MORE THAN THREE QUARTERS OF A CENTURY
COMPLETE HEAT TREATING EQUIPMENT OIL GAS ELECTRIC · ALL STANDARD FINISHES
SPECIAL DEPARTMENT FOR SMALL ORDERS · EXPERIMENTAL DESIGN CO-OPERATION

Chromium gives longer life to High-Manganese Steel Castings

CHROMIUM increases the wear resistance of twelve per cent manganese steel castings. The addition of one to three per cent chromium to the manganese steel materially reduces the amount of cold work required to produce a desired hardness. Thus the castings last longer in service . . . The chromium can be easily added to the steel in the furnace as high-carbon ferrochrome.

Ask an Electromet metallurgist to call and show you how you can improve your manganese steel castings with small amounts of chromium. He will explain the proper practice to obtain the best results. Write today for additional information.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Carbide and Carbon Building, 30 East 42nd St., New York

Manganese steel castings are widely used in dipper buckets, dredges, rock crushers and other parts subjected to severe abrasion.

CHROMIUM
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
High-Carbon Ferrochrome (maximum 6.00% carbon)
High-Nitrogen Ferrochrome
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

CALCIUM
Calcium-Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon

ZIRCONIUM
12 to 15% Zirconium
35 to 40% Zirconium
Aluminum-Zirconium

SILICO-MANGANESE
All grades including Silico-Spiegel

MANGANESE
Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Spiegeleisen
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys

SILICON
Ferrosilicon 15%
Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 90%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% silicon)
Miscellaneous Silicon Alloys

VANADIUM
All grades

BRIQUETS
(Patented)
Chrome Briquets
Manganese Briquets
Silicon Briquets

COLUMBIUM

TUNGSTEN

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

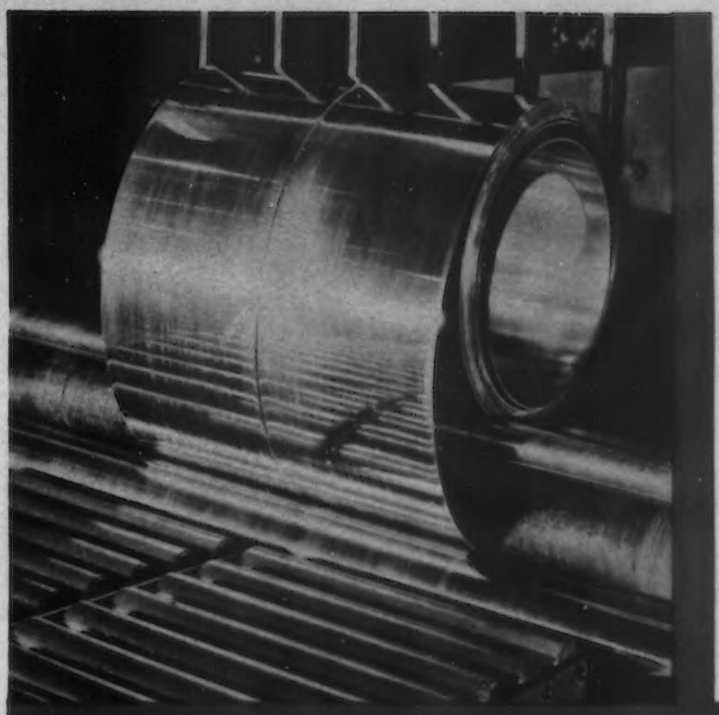
Electromet
Ferro-Alloys & Metals

Pygmies if judged by weight, but giants in strength, are these products of the Utility Mine Equipment Company of St. Louis, Missouri; a rail punch, a spike bar, and a bender suitable for use on rails as heavy as 100 pounds. Each is capable of doing work formerly accomplished only with equipment weighing two to three times as much.

Little Giants

The ease with which the tools can be handled makes it possible for one to do work which previously required at least two men. Alloys of Alcoa Aluminum made possible the production of equipment having the necessary high strength in combination with the natural lightness of Aluminum. ALUMINUM COMPANY OF AMERICA, 2185 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA · ALUMINUM



Heat plays an important part in the production of many Aluminum products, varying physical properties of the metal according to exact requirements. Great care is employed in the design and operation of annealing and heat treating equipment. Temperatures are controlled with an accuracy that is characteristic of all Alcoa processes.

Aluminum the Made-to-Order Metal

On this page you see Alcoa Aluminum sheet, coiled after having been slit to narrower widths, being placed in an annealing furnace. This prepares it for further rolling or fabrication. ALUMINUM COMPANY OF AMERICA, 2185 Gulf Building, Pittsburgh, Pennsylvania.

★ ALCOA ★

ALCOA ALUMINUM

THE OWNER* OF THIS 750-TON STEELWELD PRESS BRAKE Says:

"A MISTAKE THAT WE DIDN'T BUY IT YEARS AGO— ONE OF THE BEST MONEY-MAKING TOOLS IN OUR SHOP."

● This unsolicited endorsement from a nationally prominent manufacturer, handling 12 ft. ½-in. stock, forecasts the more efficient and less costly operation you too can secure with Steelweld Press Brakes.

Steelweld Press Brakes give straight, dependable bends. They are unexcelled as either a production or jobbing tool and assure uninterrupted operation, eliminating breakdowns and delays. No Steelweld Press Brake has broken in service. Even when stalled at the bottom of the stroke, under full loading, a Steelweld Press Brake can be backed off instantly without damage—and continue immediately in production.

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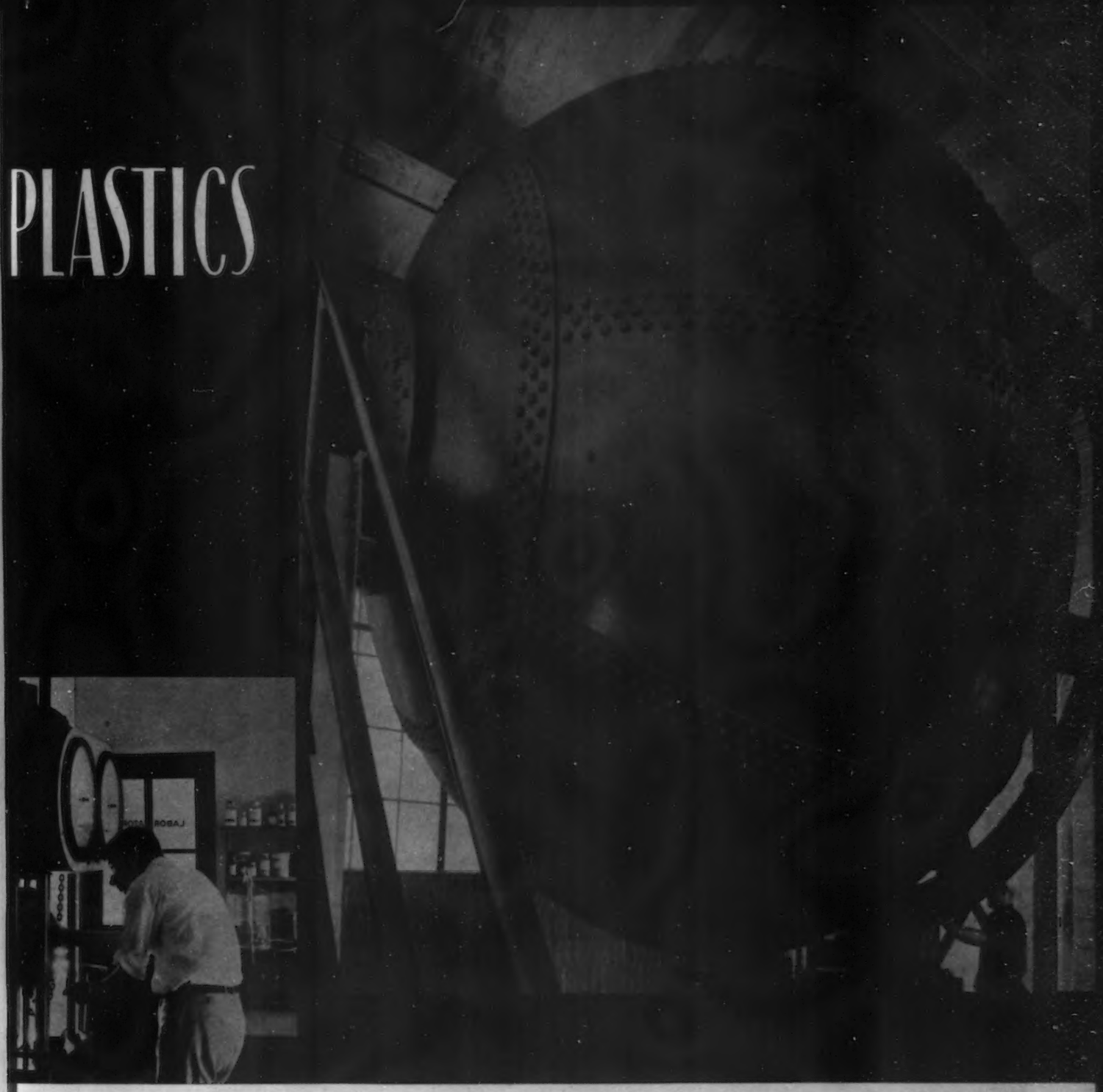
6990 Machinery Ave., Cleveland, Ohio

*Name on request

STEELWELD
PRESS BRAKES

PLASTICS



TAYLOR Phenol Fabric . . . a form of plastic material that, cut into gears, has strength for the heaviest duty at about one-sixth the weight of steel, has also the ability to absorb shocks and deaden noise. It is impervious to oil and water and most chemicals, unaffected by oxidation, fumes and dust. A truly remarkable material, synthetic product of modern research, of known characteristics . . . tested in the Taylor Fibre Company's laboratory on a Southwark-Emery Universal Testing Machine.

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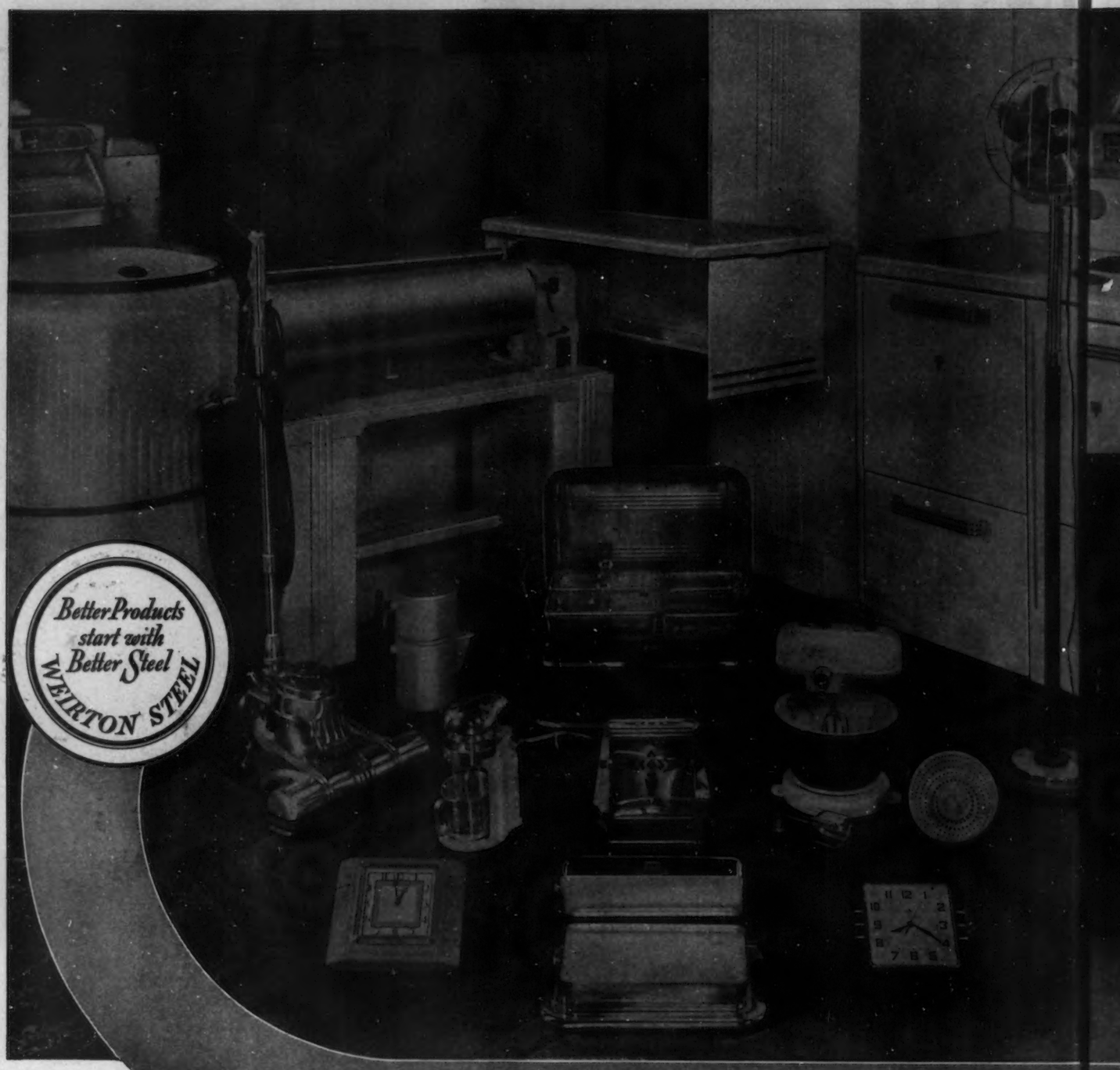
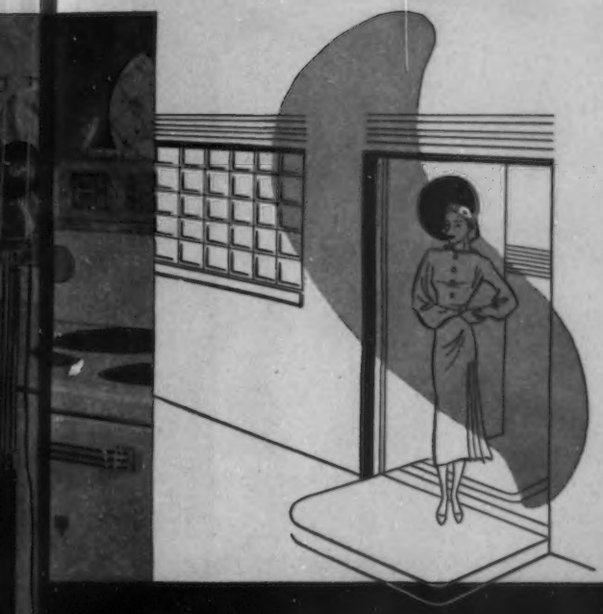


UNIT OF NATIONAL

place for WEIRTON STEEL



Home doors swing wide to welcome products of steel

"WHEN steel comes in at the door, drudgery flies out by the window," is the way an old saying might be paraphrased to account for the widespread and growing popularity of household appliances fabricated from steel.

Washers, driers, ironers and pressers . . . heaters, cookers, toasters and bakers . . . fans and clocks, floor sweepers and scrubbers . . . these and countless other items perfected by designers and home economists to emancipate the housewife from needless toil are made readily marketable because they are built around the manifold advantages of steel.

Weirton steel continually is bringing new opportunities for profitable business to manufacturers of household appliances and a hundred other lines. May we show you how it will effect economies, expand production facilities, and improve your quality standards?

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NATIONAL STEEL

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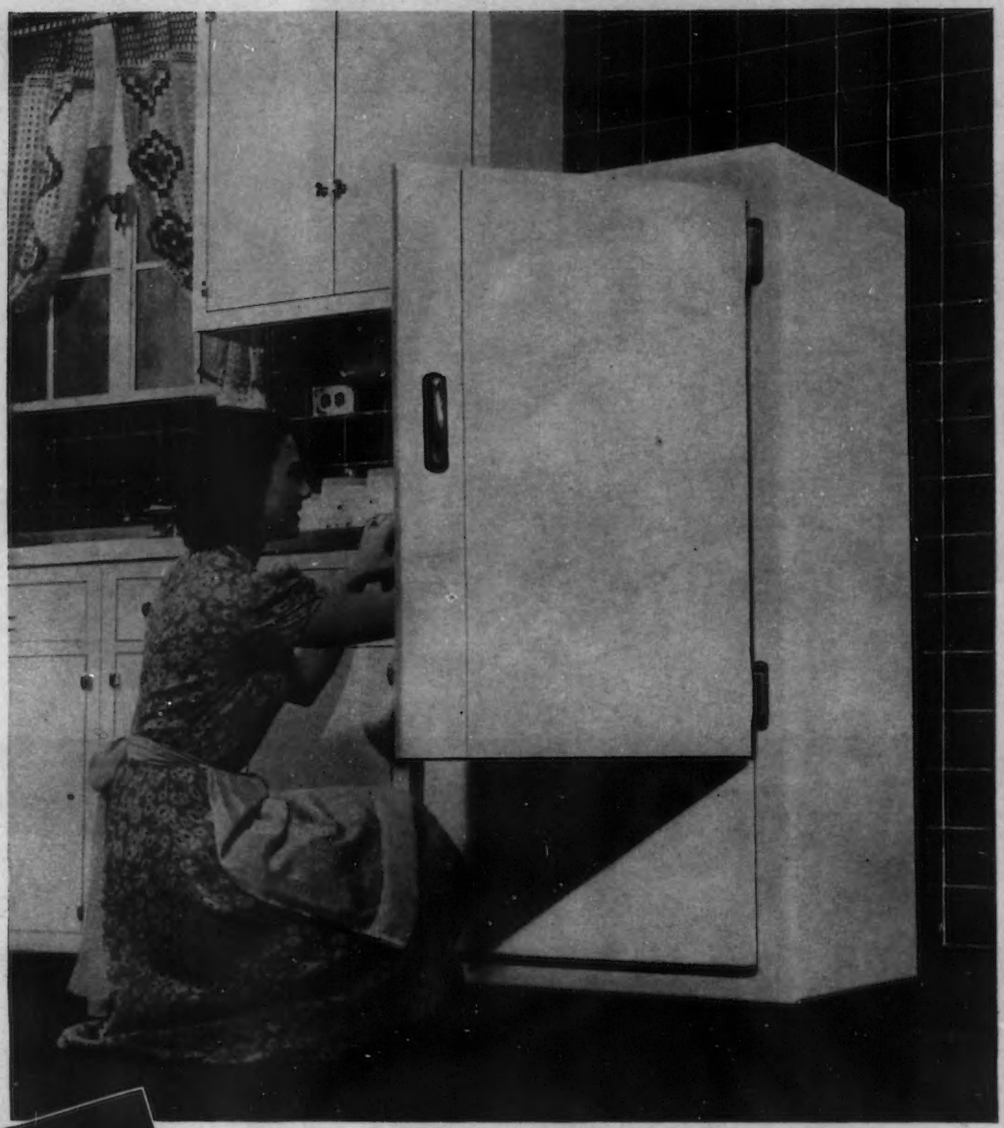

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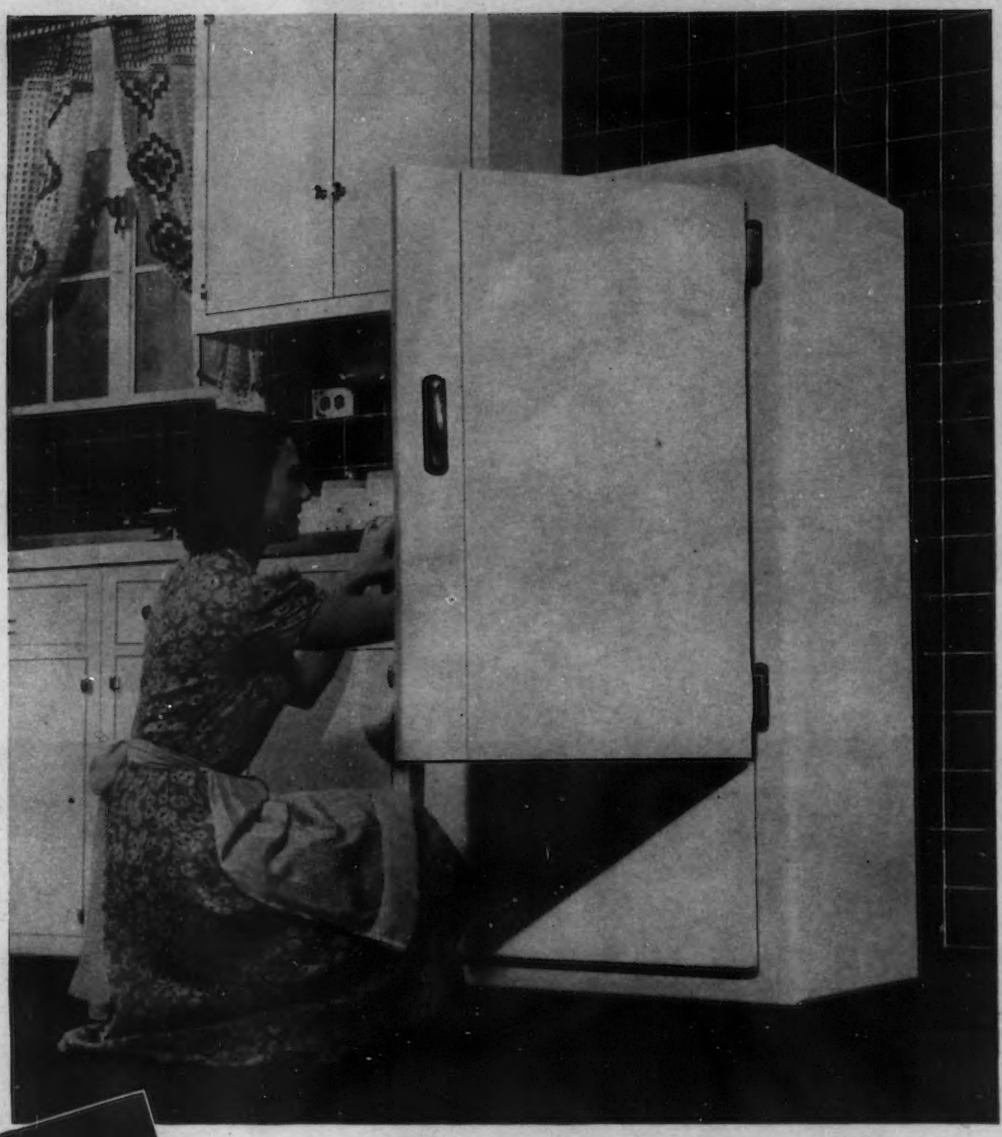
Once more SKF Bearings play an outstand-

WHERE FLAT SHEETS ARE ESSENTIAL



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TAKE the side panel of this refrigerator as an example. Steel sheets as large as 36 by 144 inches are used. No press work, practically no forming. Sheets must be absolutely flat; they must have a surface smooth enough to take this beautiful finish.

Makers of products demanding such qualities are finding satisfaction in Bethlehem Cold-Rolled Sheets —stretcher leveled, resquared.

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BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

All power car journals of

The Super-Chief

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● Built by Electro-Motive Corp. for The Atchison, Topeka & Santa Fe Railway System.

A. S. F. Units, equipped with SKF Bearings, are used on all other cars.

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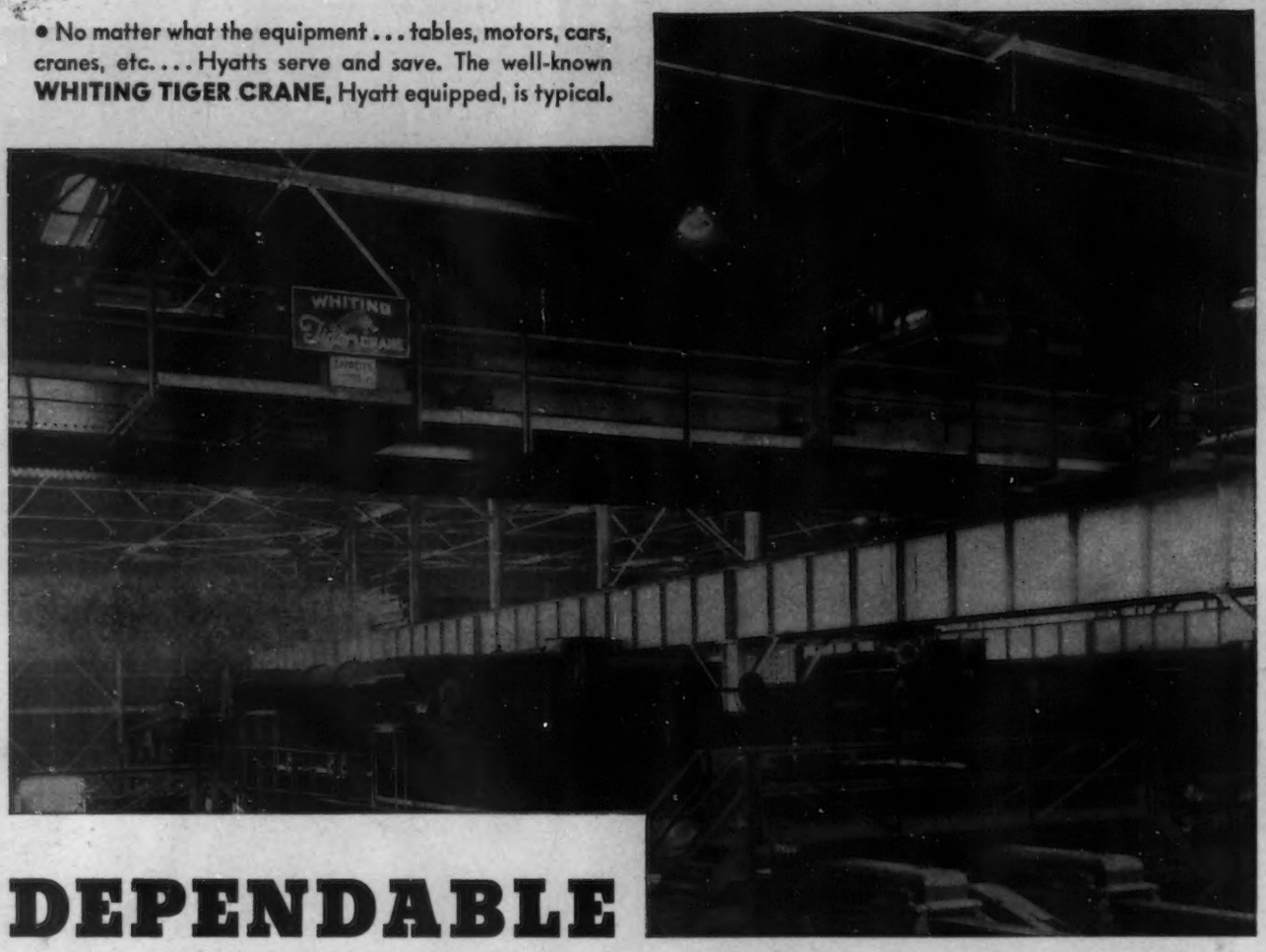
3951

• No matter what the equipment . . . tables, motors, cars, cranes, etc. . . . Hyatts serve and save. The well-known **WHITING TIGER CRANE,** Hyatt equipped, is typical.



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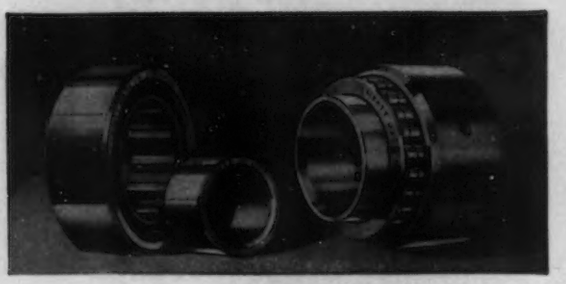

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Philadelphia used to be two days from New York. Now *steel* makes it in two hours . . . You can live in healthful suburbs yet work in the city, because your steel automobile makes minutes out of miles . . . You can do business with the nation and the world—instead of only a few neighbors—because of steel machinery and transport. Because it constantly conquers distance and discomforts, *steel* makes America the most compact and progressive continent in the world.

Because steel is so definitely part of our modern life, we take it too much for granted. Do you realize that there are not scores, not hundreds but thousands of kinds of steel? Each has a certain purpose or product for which it is best suited. Here at Youngstown, when we receive an order for steel—no matter how small nor how routine the use—we will not begin that order until we are certain we have exactly the right steel for the purpose.

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Manufacturers of Carbon and Alloy Steels

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Chicago Surface Lines operate 152 trolley buses and 105 gasoline buses which cover 812,000 miles per month and carry approximately 65,000,000 passengers per year.

The new a. c. f. buses furnished to the Chicago Surface Lines by J. G. Brill and other buses recently purchased by Chicago Surface Lines are equipped with Chromium-Vanadium Steel Springs.

Bus service calls for the best in springs... riding comfort... dependability... economy. Chicago Surface Lines, like many other fleet operators of buses and trucks, know from experience that Chromium-Vanadium Springs are easy riding, long-lived springs that stand up under hard service.

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VANADIUM

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For all INDUSTRIES *and all* PRODUCTS

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STEELMAKING *is a* PARTNERSHIP BUSINESS

Illustration shows ingot being removed for rolling from one of nine newly designed circular soaking pits recently installed by Inland.

Few finished products come from a steel mill. That's why Inland for many years has specialized in close, highly practical co-operation with manufacturers and fabricators whose processes give steel final form and usefulness.

Inland has definite advantages for this kind of service because it is a good-sized, well co-ordinated unit that can act speedily in the customer's interest.

You'll find Inland management as keenly interested in meeting the special requirements of your business as your nearest Inland office or the field man who visits your plant.

You'll find that this quick control over the steel you use eliminates many a troublesome production problem that becomes difficult to solve in your plant alone.

INLAND STEEL

SHEETS STRIP TIN PLATE BARS RAILS TRACK ACCESSORIES PLATES FLOOR PLATES
STRUCTURALS PILING REINFORCING BARS

INLAND STEEL CO.

General Offices: 38 South Dearborn Street, Chicago, Illinois • Offices in: Detroit Kansas City Milwaukee St. Louis St. Paul

What Comes BEFORE ?

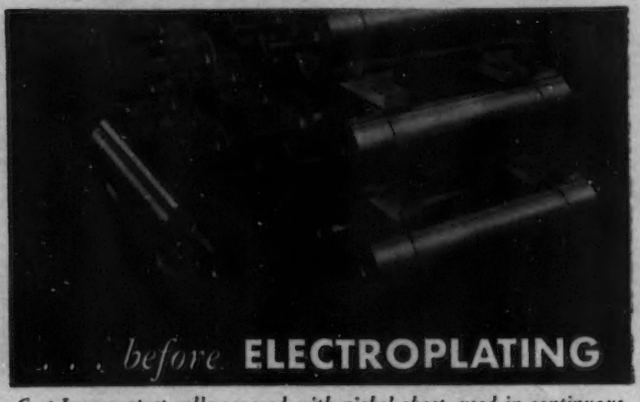
This modern, light-weight welded Monel pickling crate is one of six used in the plant of a well-known stamping company for acid pickling of drawn steel ware prior to enameling. These strong, durable, welded Monel baskets weigh only 744 lbs. apiece.

20 years—still giving constant service. These veteran Monel baskets are used for pickling small stampings, forgings and chaplets in hot sulfuric and cold muriatic acid baths prior to galvanizing. The long basket at the back, in daily service since 1916, is as serviceable as the last basket which was put into service in 1923.

answer:

PICKLING in Crates and Baskets of MONEL

A typical Monel pickling crate for handling fabricated metal articles. Notice how it is made up of standard mill forms and accessories that are all regularly available in Monel. Products like wire trays are pickled in this crate prior to tinning.



Cast Iron contact rolls covered with nickel sheet, used in continuous plating of steel strip. Bi-metal rolls of this type with corrosion-resistant coverings of either Nickel or Monel over a steel, cast iron or bronze base, are now regularly produced in all sizes required for plating and pickling equipment. Shafts are solid Monel. Ends of the rolls may also be covered. (Your old rolls can be successfully covered in the same way.) These covered rolls offer the same corrosion-resisting qualities as solid Monel or Nickel rolls and at considerably lower cost. Standard Monel baskets are regularly used in pickling and cleaning articles prior to plating.

BEFORE your products get their expensive finishes—that's the time to insure quality. That's the time the manufacturers here represented rely on pickling crates and baskets of Monel.* And for very good reasons:

Monel offers strength and toughness with light weight. It resists corrosion from your pickling acids—you don't have to have excess weight to have sufficient strength or to allow for loss of strength due to rapid corrosion. Monel crates far outlast any others you may have used. *And remember, Monel is readily fabricated to whatever shapes best fit your needs.*

You're on the way to savings and to better work when you get the data on Monel. Ask us for your free copies of "Equipment Designs for the Pickle House" and "A Good Start to a Better Finish."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.

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*Monel is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. This alloy is mined, smelted, refined rolled and marketed solely by International Nickel.

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THE IRON AGE

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RYERSON STEEL-SERVICE

▲▲▲ THE IRON AGE ▲▲▲

November 11, 1937

ESTABLISHED 1855 Vol. 140, No. 20

The Fable of the Slippery Nude Eel

AESOP treats in his fables of many members of the animal kingdom, but there is one that he overlooked, namely, the nude eel. We cannot blame him for that, for if there were any nude eels in his day, they stayed out of sight at the bottom of the pond and did not make public appearances.

If Aesop lived today, he would surely include the nude eel in his cast of characters. Certainly, of all of the varied members of the multifarious tribes of fish, flesh and fowl, no other has been more spectacularly in the public eye for the past five years.

Bringing the subject up to date in this matter, one might relate the following fable:

The inhabitants of a community depending upon a certain pond for their water supply became worried as a long drought lowered the water level. Water, of course, was a common and prime necessity for rich and poor alike; hence a shrinkage in the supply was a menace to the well-being of each and every one. What was to be done about it?

Engineers said that the remedy was to build reservoirs in the mountains and lay feed mains to the pond. But that would require a great deal of work, time and money and the people wanted something done in a hurry; nor were they content with the thought of reducing their water rations.

Professional rain makers were called upon and set up their mysterious contraptions, but still the dry spell continued unbroken. Then one day, while the populace gathered about the pond puzzled as to what to try next, the nude eel came to the surface and made a waterside speech to them.

"I am the one to solve your problem," said he. "You have never before beheld anyone as agile and adaptable as I am. I can move faster and in more directions at once than any other creature. I can even tie myself in knots.

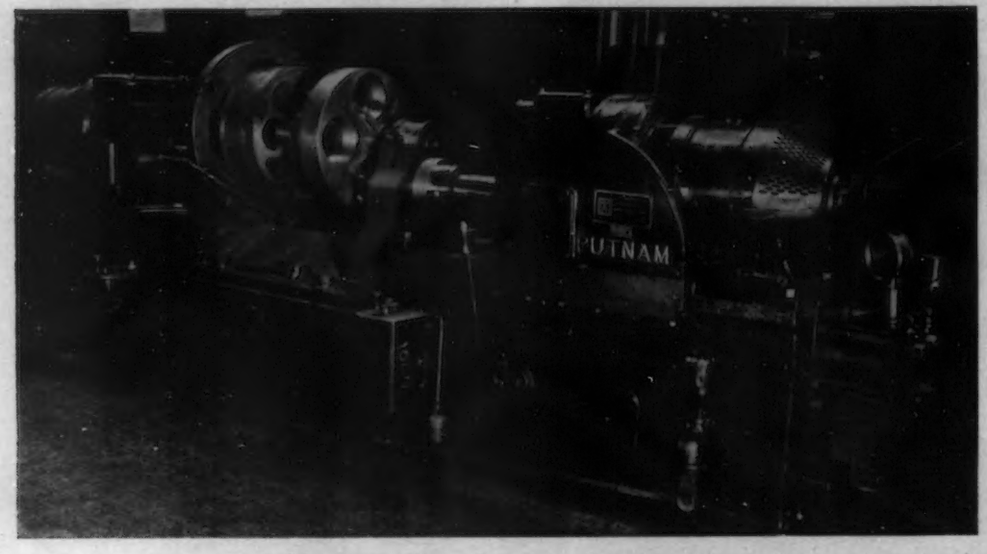
"I will now proceed to raise your water level," said the nude eel, whereupon he moved about the pond so energetically and with such gyrations that waves were set up on the surface in all directions and it appeared to many that the water was actually getting higher. After a long period of watching, however, the people found this was not so; in fact so much water was being splashed out of the pond that the level was getting lower and lower.

Aesop always put a moral at the end of each tale, so we will have to attach one to this. It is: You cannot hold a nude eel to its promises so long as there is a squirm left in him.

J. H. Van Deventer

Finishing Spindle Carrier Holes

THE time of finishing spindle holes in a spindle carrier for an automatic screw machine has been reduced from 500 to 600 per cent by the National Acme Co., Cleveland, by the recent substitution of boring for grinding for the finishing operation on these holes. This finishing is now being done on a Bore-Matic machine built by the Heald Machine Co., and equipped with special indexing and other devices, the special features being developed by the National Acme Co. In addition to speeding up this finishing operation, closer tolerances and more accurate alinement are being maintained than was possible when the finishing was done by grinding. Extremely close limits are required for the diameter of the spindle holes, four or six in number, depending on whether the carrier is for a four- or six-spindle machine, spacing between the holes, distance



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ROUGH boring the holes of a spindle carrier on a double-end boring mill equipped with a special indexed fixture.

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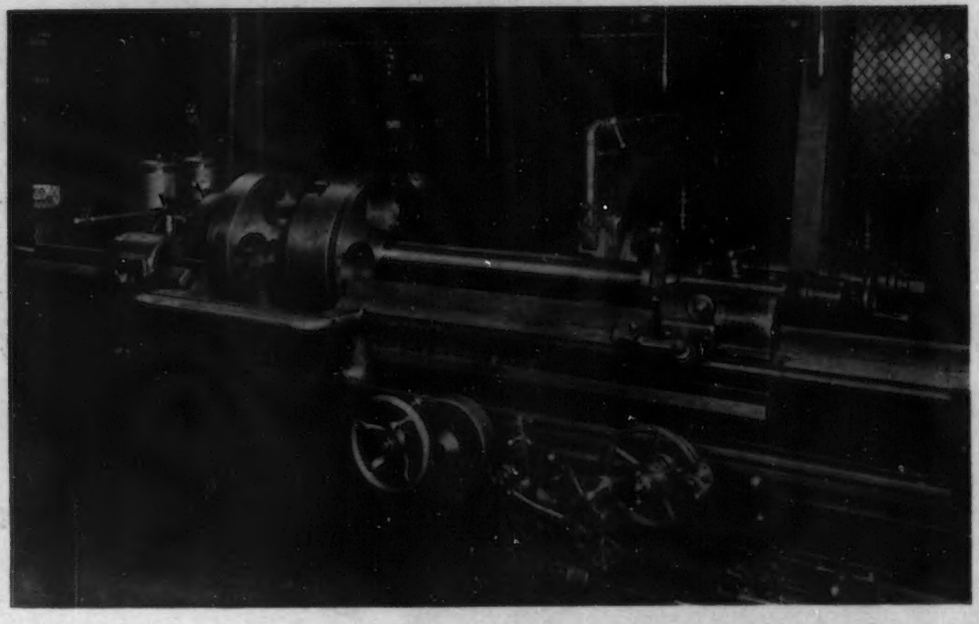

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THE outside diameters of the stem and spindle carrier and the faces of the drums are ground in one set-up.

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by Grinding

By FRED L. PRENTISS
Cleveland Editor, The Iron Age

from the holes to the stem of the carrier.

With the automatic screw machines of large capacities that are now being built, the spindle carriers are of large dimensions, being up to 26 in. in diameter, and the castings from which they are made weigh as much as 1200 lb. before machining. These carriers have two drums, a front and rear drum, and the spindle holes which extend through both drums must be in perfect alinement. In addition to the spindle holes there is a center hole in which the stem is pressed. The sizes of these holes vary, their diameter depending on the sizes of the spindle carriers. All holes are cored in the casting sufficient metal being left to finish the bore.

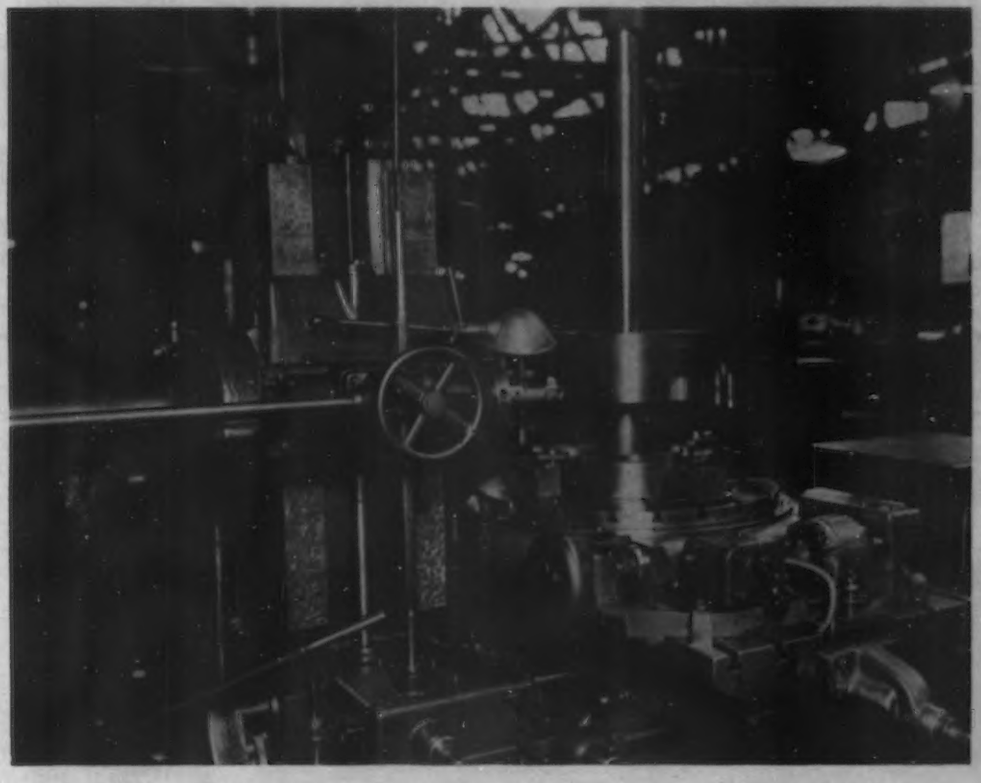
The first of the sequence of machine operations is rough turning which is done on a vertical boring mill. The casting is then normalized for 35 to 40 hours at approximately 300 deg. F., to remove strains in the metal. After normalizing, the carriers are finished, turned on boring mills, 0.025 in. in metal being left for removal in the finished grinding. At the same time the center hole is bored out to size. This assures the concentricity of the spindle and center hole. The casting is then turned over, being located from the center hole, and is finished turned on the opposite end.

Rough boring the spindle carrier holes is the next operation. This is done on an especially designed double-end boring machine. The spindle carrier is located in this machine by special fixtures designed to assure both the correct location of the holes and correct spacing.

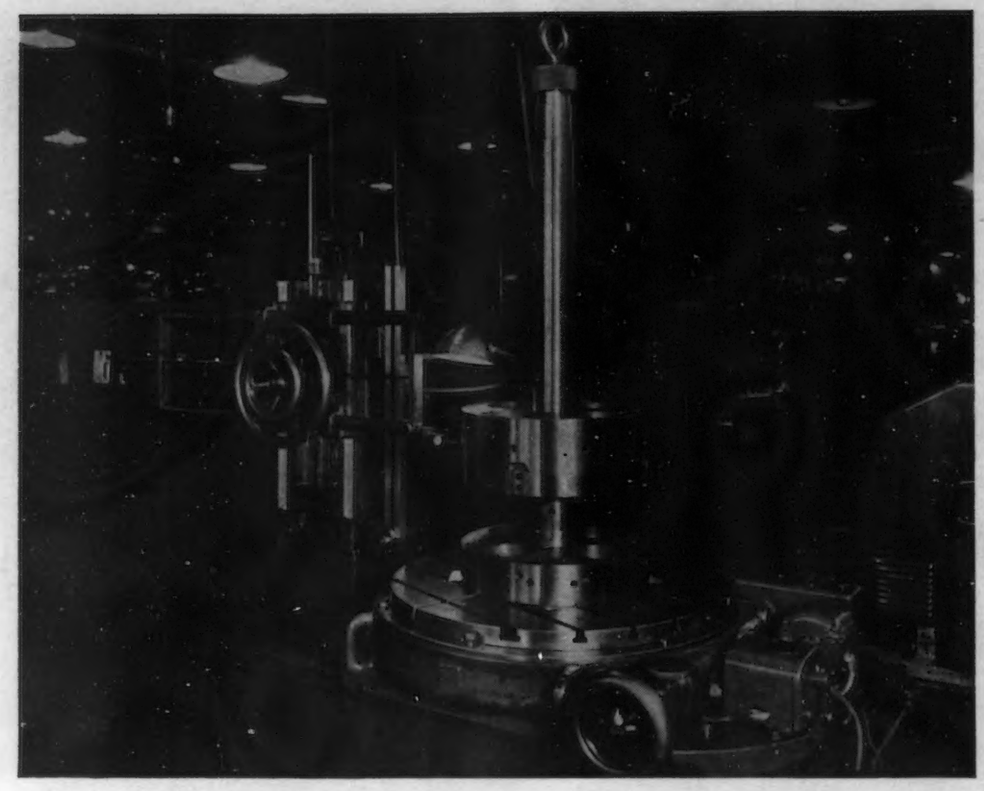
This operation is followed by drilling numerous small holes in the spindle carrier. These holes are for oil, retainer, indexing gears, and locking blocks. All small holes are drilled with jigs to make sure that all spindle carriers are uniform and to insure the interchangeability of the parts that are fastened to the spindle carrier.

The next operation is assembling the stem to the casting. The stem is pressed into the center hole with a six- to ten-ton pressure on an arbor press. After this is done, two taper pins are driven in which hold the stem securely in the spindle carrier.

The carrier with its stem assembled is then turned on a lathe to assure the accurate alinement



MILLING blocking bar slots on a Lucas boring machine with the spindle carrier mounted on a rotary table equipped with jig bore indicators.



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CHECKING the locking blocks for proper spacing on a rotary table with a master bar indicator.

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of the two members. In this operation the drums and stem are held to within 0.002 inch limits. After the outside diameter is finished turned to the limits, the faces of the spindle carrier are finished turned in the same set-up so that they are perfectly true. The next operation is the grinding of the carrier drums and stem, both members being ground in one set-up to assure their concentricity. All diameters and faces of the spindle carrier and stem must be held within 0.0005 in. limits.

Then the locking block slots are milled out. This is done on a Lucas boring machine. the work being mounted on a Pratt and Whitney 30 in. rotary table equipped with jig borer indicators. These slots are milled to 0.0002 in. limits and are spaced within 0.001 in. limits. Then the locking blocks are assembled to the carrier after which the carrier is put on another Pratt and Whitney rotary table to check the blocks for proper spacing. A specially designed machine equipped with high-position indicators is used to check the spacing, the faces of the blocks being held within 0.0001 in. limits.

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FINISH boring the spindle carrier on a Bore-Matic machine provided with various indexing attachments.

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The spindle carrier then goes to the Bore-Matic machine for finishing the spindle holes. The carrier and stem are located in a specially designed fixture to hold the carrier in perfect alinement with the boring heads. An indicator is provided at the sides of the stem to assure that its alinement is perfect. A pneumatic plunger that is operated with a push button moves into the slots locking the carrier for the boring operation.

The boring heads are held stationary while the carrier, locked in the fixture that is fastened to the slide, moves backward and forward with the slide which is hydraulically controlled. With the forward movement of the slide a spindle hole in one drum is finished bored and with the backward movement a hole in the other drum is finished bored. The carrier is then indexed for the next hole.

Finish boring is done with a Carboloy tip tool. After every setup for spindle carriers of different sizes the boring heads are removed and special attachments are provided to check the holes as these must be perfectly true. The inside of the holes are also checked with a master gage. When all the holes are finished bored, an indexing gear is attached to the front face of the rear spindle carrier drum with screw bolts.

Final inspection follows, a record of which is kept on test sheets. The diameter of the front and rear holes in the carrier are held within limits of minus zero and plus 0.0002 in. and the spacing between holes 0.0005 in. The radial distance from the center of the hole to the shaft is held within average limits of 0.0005 in.

FINAL inspection of the spindle carrier holes with the stem.

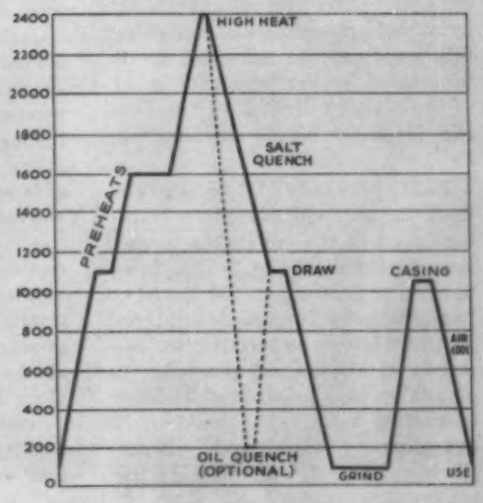
The carrier stems are made of alloy steel. After these are cut to length from bar stock they are rough turned, annealed, and normalized, semi-finished turned and then carburized. Then both ends are turned down to remove the carburized surface on the ends. After these operations, a hole is drilled through the stem for the spindle drive shaft. Then the stem is hardened, the large diameter of the stem between the two ends being left with its hardened surface. Then the stem is finished ground on one end so that it will fit in the hole in the spindle-carrier. After the stem is assembled to the carrier all other finishing operations are performed in connection with the grinding of the spindle carrier as previously outlined.

Houghton Introduces "Liquid Heat"

A COMPREHENSIVE cycle of high-speed steel treatment has been announced by E. F. Houghton & Co., Philadelphia, in a bulletin describing new high-speed steel salts recently perfected by its research staff.

The cycle of treatment, as shown in the accompanying diagram, employs products designated as "Liquid Heat." For the preheat, a neutral hardening salt, which will neither carburize nor decarburize, is provided. Liquid Heat No. 2400, with a working range to 2500 deg. F, is recommended as a high-heat salt. Work may be quenched in oil or given a salt-bath quench following the quick high-heat treatment.

After being drawn, the work is ground and a case is super-imposed upon it by a further liquid bath, recently perfected, giving an outer case 0.001 to 0.002 in. in depth. This additional treatment adds a hardness of more than 1000 Brinell, and increases production of high-speed tools from 25 to 300 per cent, according to the makers.



Compact Foundry Layout Cuts

IN recent years many foundries have adopted the use of conveyor systems to facilitate the flow of castings from one work station to another. Quantity production is, however, usually a requisite for economical production by this method, and consequently, foundries with tonnages insufficient to justify the installation of conveying systems have turned to other avenues to promote the flow of castings. The following description is of a foundry that has achieved outstanding success in this respect by attacking the problem from the angle of plant layout. Its success merits the consideration of other foundrymen faced with a similar problem.

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THE problem faced by many foundries which melt tonnages too small to justify the installation of continuous pouring methods, yet large enough to require mechanization to maintain competitive costs, is that of locating processing steps in a manner to avoid costly rehandling as much as possible. In short, production must flow smoothly from point to point without interruption. The fundamentals of foundry practice make this a difficult goal to reach without using conveying equipment, yet by careful planning and designing this end may be achieved, as is illustrated by the layout (Fig. 1) of the foundry division of the Textile Machine Works in Reading, Pa.

Built primarily to supply the iron, bronze and aluminum castings used in the textile machinery manufactured by the Textile company, the output of the foundry has gradually increased until today, in addition to meeting the demands of the parent company, it also takes in a substantial tonnage of custom work. The building is one story in height and built on sloping ground, permitting the erection of a railroad spur direct into the cupola charging room. As a step toward reducing heavy hand labor to a minimum, industrial electric trucks are used extensively as a direct production tool, a position to which they readily lend themselves.

The foundry proper is divided into two sections—ferrous and non-ferrous. The brass and bronze melting equipment and the core ovens are located along the south wall. Immediately across the gangway are the non-ferrous molding and core making facilities. By consulting the chart it will be observed that bronze and aluminum castings progress by very short movements from the pattern shop through the core room, the baking ovens and molding section, to the gate cutting department. The advancement of the castings from this point to the cleaning room represents the greatest distance a casting is required to travel between production points. As gray iron production accounts for the bulk of the foundry's output, it is obvious that from the cost angle it is more economical to move the non-ferrous castings this distance than to move the iron castings.

Bronze metal is melted in three Detroit electric rocking furnaces of 400 lb. capacity, turning out an average of eight heats a day. Charges are composed of approximately 70 per cent ingot metal and 30 per cent rejected castings. In order to secure closer control on the analysis of the cast metal, no foreign scrap is used. Fumes incidental to the reducing operations are drawn off by forced draft exhaust hoods mounted above the furnaces. Reducing temperatures are kept under constant observation through a panel-mounted pyrometer on each furnace. Metal is poured at 2150 deg. F., with a 50 deg. plus or minus maximum variation permitted. Aluminum is melted in two additional electric furnaces, and, when production requires, also in two gas-fired Monarch furnaces of 150 lb. capacity. Prevention of unnecessary waste of molten metal in warming ladles is accomplished by use of a gas-fired ladle warmer which can be seen in the background of Fig. 2.

Gray iron production occupies the entire northern half of the foundry. Three 72-in. Whiting cupolas, operated alternately, supply the required 50 tons of metal per day. An examination of a fractured test bar reveals a soft, clean, close-grained iron, with an average analysis of 2.35 silicon, 0.75 manganese, 0.40 phosphorus and 0.10 sulphur. Total carbon in the metal runs about 3.50 per cent with the combined portion averaging 0.50 per cent. Manganese deficiencies in the pig iron are adjusted by the addition of ferromanganese briquets, broken in two, to the charge. This practice requires constant high temperatures in the melting and refining zones

Rehandling Costs

By WILLIAM A. PHAIR

in order to facilitate the union of the manganese and iron and to take advantage of the deoxidizing effects of the alloy. To secure this an automatic weighing device is incorporated into a centrifugal blower to adjust the blast pressure to the varying conditions in the stack. Occasionally in special work where higher tensile strengths are desired, chrome-molybdenum alloys are incorporated into the metal by ladle additions. Here again high temperatures are required to promote the absorption of the additions. In "cold" iron the additions rise to the surface and are lost, or appear as segregations in the finished casting.

For the past several months the melter has been experimenting with small pigs in the charges, and, although sufficient time has not elapsed to permit the formation of definite conclusions, the piglets have gained favor for several reasons. One is that the charging gang prefers the lighter weight of the small pigs. Another is that the foundry foreman has noticed a definite decrease in the blast-on time required to melt a given tonnage, when smaller pigs are used, which suggests that the greater area per pound of iron exposed to the incandescent coke and hot gases promotes faster melting.

Core sand and facing are mixed

FIG. 1—Layout of the Textile Machine Works foundry. Arrows indicate direction of flow of castings through various processing departments.

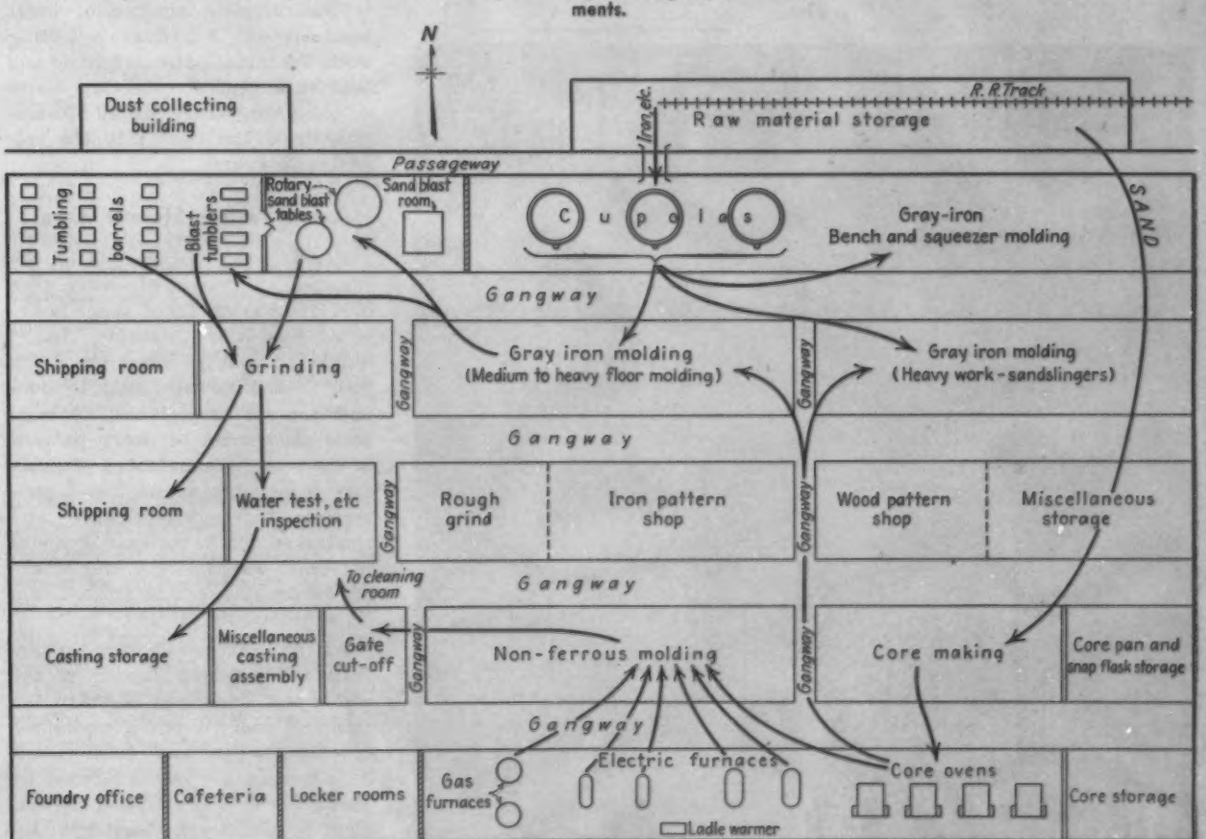

FIG. 2—Tapping a brass heat from a Detroit electric rocking furnace. Ladle warmer may be seen in the background behind the furnace operator.

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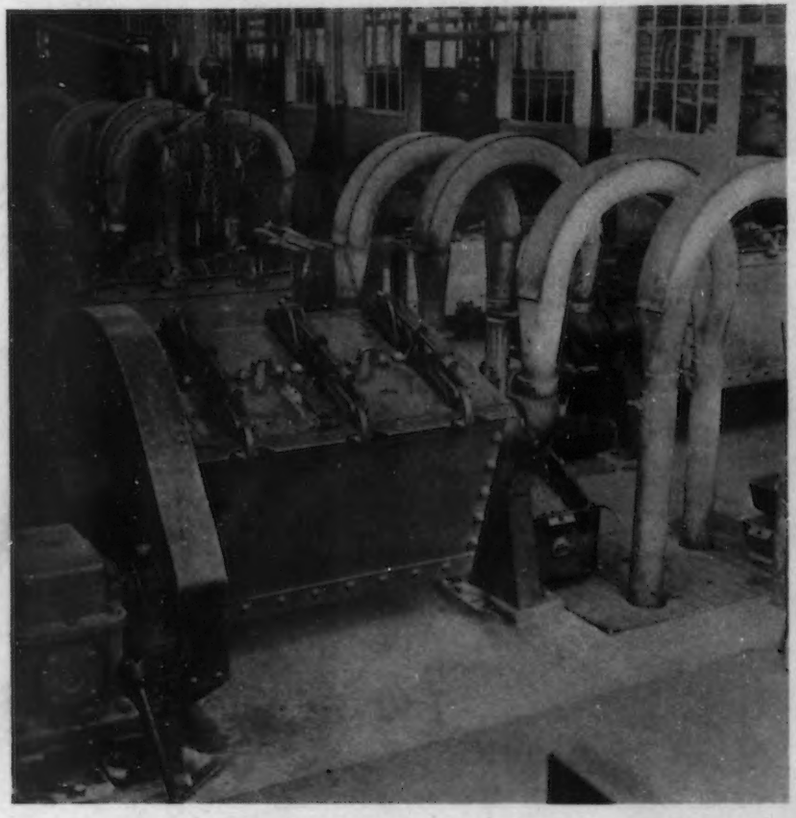
FIG. 3—View of cleaning room showing dust exhausting pipes leading to underground ducts.



in an intensive muller located in front of the core and molding sand bins and are conveyed to the foundry via electric trucks equipped with dump hoppers. Cores are baked in oil burning core ovens of the air recirculating type with automatic control of both the heat and the baking period. On certain types of core work calipers are used in assembling the cores to insure identical core cavity dimensions in every casting.

After pouring and shaking-out the day's work, the castings are loaded into large crane buckets and moved into the cleaning room. Entirely housed in, the cleaning room is adapted to take care of any type casting made in the foundry. A sandblast room takes care of the large work, while a rotary sandblast table is used for production cleaning of bronze and aluminum castings. The conventional tumbling barrel is gradually being replaced by blast-tumblers which reduce the cleaning time substantially, and at the same time give the castings a much smoother surface finish. Steel grit is gradually supplanting sand in blasting operations because of its dustless quality and the ease with which it may be handled. An unusual feature of the cleaning and grinding rooms is the complete absence of overhead pipe. All dust collecting ducts are installed underground and lead to a central collecting house in the yard, where six 40-hp. motors draw the dust into the collecting hoppers.

Large Pattern Storage Area

Beneath the eastern end of the foundry, a basement containing over 100,000 cu. ft. of space is devoted to pattern storage. Large numbered racks reaching from floor to ceiling are used to hold patterns not in the sand. A complete card index of every pattern in the room is maintained, and before being stored away each pattern is thoroughly cleaned and shellacked, or, in the case of metal patterns, waxed. Any one of the 32,500 patterns can be located in a short time.

As the chart shows, the distance from the grinding section to the water test and from there to the shipping room is but a matter of crossing the gangway. In this plant departments are not separated by partitions or walls. Each department is actually a "section." In-

gress and egress is possible from several sides, a fact that prevents congestion and eliminates doubling back on the line of processing flow.

An unusual method is used in testing the chambers of bronze water meters for leaks. After passing through a rotary sand-blast machine, the chambers are surface ground and tested for porosity in the following manner: A jig clamps the open face of the chamber to a square of soft rubber. The outer surface of the casting is then painted with a soap-water solution and air under pressure enters through a hole in the rubber pad. Leaks are immediately identified by the formation of bubbles on the soap-water painted surface of the casting.

. The plant set-up described enables this foundry to cast all manner of work, from small ⅛ oz. castings on a match plate to heavy machine parts. The layout is flexible enough to permit major changes in production schedules without impeding or interrupting the normal functional activities of the individual departments along the line of flow.

FIG. 4—Interior of dust arrestor house which is kept unusually clean to eliminate the dust hazard.

Special Pickling Tanks Handle Steel Plate for Battleships

BRINGING Uncle Sam's navy up to full peacetime strength is keeping many a shipyard hustling these days. Accompanying photo shows the plate yard in the plant of one of the nation's largest shipbuilders where the steel plate is cleaned prior to use in the construction of battleships.

The large size of these plates necessitates a pickling tank construction of unusual design. The two tanks illustrated were supplied by the B. F. Goodrich Co., Akron, Ohio. They are made of heavily reinforced steel and lined with a ¼-in. thickness of Triflex rubber which is covered with two course acid-proof brick jointed with a sulphur base compound. As a precaution against chipping or cracking due to contact with the steel plate, the brick is covered with a cushion of timbers. The inside dimensions of these two tanks are length, 42 ft.; width, 5 ft.; depth, 11 ft.

Electric

By A. S. BURGOYNE

Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn.

GAGING strip thickness electrically at high mill speeds.

ELECTRIC gaging has increasingly replaced "hand miking" in the production of sheet steel and strip steel and tin plate. The reason is that it permits maintaining closer thickness-tolerances, and this without requiring any slowing down of the mill. With modern continuous strip mills operating at 1500 ft. per min., the latter is obviously of outstanding importance, for "hand miking" would require slowing down of the mills to 300 ft. per min. or less.

The need for close thickness-accuracy derives from the larger sized sheet metal stampings required for streamlined auto bodies, refrigerator cabinets and the like. In producing such stampings larger dies and deeper draws are used, and if the sheet metal is not of uniform thickness, trouble is experienced in the stamping operation. This may take the form of undue wear in the big dies or actual die breakage.

Sheets Classified and Roll Pressures Measured

The Pratt & Whitney Electrolimit continuous gage, by means of which the operator may know to a ten-thousandth how thick his strip is coming out of the rolls, was first introduced in 1932, and has since been described in these columns in connection with the installation of a number of new continuous mills. Adaptations of the same electric gages have more recently been applied in steel mills, and these, designated as classifier and strain gages respectively, are described briefly in this article.

The same principle is employed in all these gages. The Electrolimit gage comprises two small rollers that are in continuous contact with the strip, which holds them apart a distance of its own thickness. Thus any deviation in strip thickness means a variation in the distance between the two rollers. These errors or deviations from desired thickness are picked up and greatly magnified by a simple electrical circuit, a ten-thousandths error in the strip thickness showing as ¼-in. movement of the needle. As long as the strip is of the desired thickness, the needle remains at zero; but if it is over or under the predetermined size, the needle will register the exact amount, plus or minus. The operator may then correct his roll setting accordingly, while the mill is at full speed. Signalling devices and recording instruments may be used in connection with the indicating instrument, either at the mill or elsewhere, including the superintendent's office.

Gages Facilitate Rolling Mill Operations

The gage may be set for any strip thickness merely by turning a handwheel on the gage head until the desired dimension appears in the small opening or window.

The Electrolimit continuous gage has been applied to cold rolling mills of all types, reversing, tandem and temper pass. On reversing mills the usual practice is to have a gage on both ends of the mill in order that uniformity of reductions and accuracy of strip may be checked when rolled in either direction. On tandem mills, gages may be used on any or all stands. Obviously the "finishing" stand is most important, but a gage on the first stand has been found to contribute greatly to production of uniformly accurate strip, and also to more efficient rolling practice.

The standard unit is designed for use on mills where the pass line is relatively constant, and provides for about ½-in. float or vertical movement at the gaging point. Where the pass line of strip is not "fixed" and builds up on the winding reel, or is varied by tension rolls between the stands of a tandem mill, the gage is modified to accommodate this pass line variations provided it does not exceed 5½ in. at the gaging point.

Classifier Gage

In classifying steel sheets, the electric gaging is done while the material is still in strip form, and sorting of the sheets is accomplished after the strip has been cut to the required length by a flying shear. A definite timing relation between the gaging unit and the sorting mechanism may be accurately maintained by means of a special tachometer generator which synchronizes the time delay between gaging the strip and sorting the sheets with the speed of the shear. The time delay is taken care of automatically for every speed of the shear. With this device the gaging and sorting of sheets become very efficient operations. "Off-gage" sheets are positively separated from "OK" sheets, or into groups of oversize, "OK" and undersize.

A modified sorting unit has been designed for application on longer sheets which are cut to length before gaging and sorting. These sheets range from 5 to 20 ft. in length, and usually travel at speeds of 100 to 350 ft. per min. The gaging unit is arranged with auxiliary equipment to automatically open the rolls as the sheet approaches them, and immediately close them

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SHEAR line equipped with an Electrolimit classifier gage. Gaging is done on the strip coming in from the left, before it reaches the flying shear. Sorting takes place at the far end after the sheet is cut to length.

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on the sheet when it is in gaging position.

For both flying shear and sheet applications, these classifier gages are standard Electrolimits with certain modifications.

Although this gaging operation takes place with a theoretically constant pass line all P&W classifier gages have a small float to compensate for slight strip movements which are always present. Experience has proved this feature very necessary for successful operation.

Strain Gages

Adaptation of the same instruments for measuring roll pressures is the latest development. In principle this strain gage is based on the fact that as pressure is exerted on the mill by the screwdown, the mill housing will stretch in a relation which is directly proportional to the pressure. This stretch is measured and then converted so that the pressure may be read directly in pounds on indicating and recording instruments.

Capable of recording as well as indicating the loads on the mill, these instruments have proved their practical value in rolling of steel, copper, rubber and paper. They are also used on other types of equipment on which it is desirable or necessary to know the exact pressure being exerted.

In addition to reducing the hazard of equipment failure caused by unintentional overloading, rolling mill loads should be constantly known to the operator in the interest of efficient mill operation. In certain types of mills and in rolling certain materials, a condition may exist where the material being rolled reaches a gage thickness uniformity at a certain rolling pressure, but an increase in the pressure will not bring about a further reduction. It is obvious that in such cases adequate pressure measuring equipment makes for efficient mill operation.

Then, measurement of pressure is of considerable assistance when setting up a mill after a roll change. When starting up after a shut-down it will afford a rapid means of "leveling up" the mill. This is especially applicable to hot mills, where rolling changes are comparatively frequent, and where a "level" mill is absolutely necessary for proper mill performance and subsequent rolling operations. It will simplify present practice after a roll change or shutdown. This is to run through a number of test bars to determine whether or not the mill is "level" and to enable the operator to make the necessary adjustments. With the pressure measuring device it is only necessary to adjust or "level" the mill to the gages. Hence, from the standpoint of convenience, rapidity and accuracy, the pressure measurement arrangement of setting a rolling mill has definite advantages as compared with the present trial and error method.

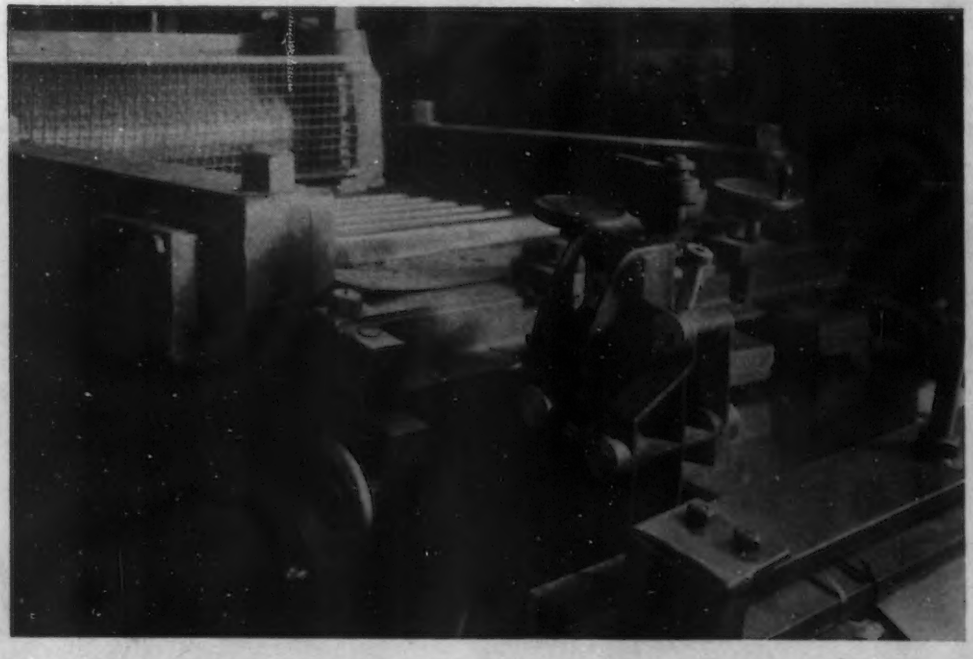
Application of pressure gages to a hot mill makes possible the proper distribution of loads to several stands of a tandem mill, and the gages will enable a uniform distribution of work throughout the series of stands. This condition applies to cold tandem mills as well as to hot mills.

Non-Uniformity of Material Detected

Non-uniformity of the material entering the mill can be detected readily by means of pressure gages, and they will assist in effecting both the necessary preventive and corrective measures. If one side of the mill requires a greater pressure than the other to produce uniform strip, it is probable that the material entering the mill is heavier on one edge than on the other.

In connection with temper pass mills and skin pass rolling, a pressure gage affords a means of maintaining a constant load; and this in turn governs the accuracy and uniformity of flat rolling.

On thin gage material excess rolling pressure will produce a condition which is directly responsible for fracture of the rolls and roll



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CLOSE-UP of the classifier gage, which in this case is set for a strip thickness of 0.0096 in.

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MILL equipped with electric strain gage on mill housing for determining rolling pressures. The indicators it operates show in the meter cabinet on the drive side of the mill.

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spalling. Uniform rolling is accomplished only by computing carefully roll pressure as well as roll crowning.

As the Electrolimit strain gage employs an electrical circuit, as many indicating, signaling and recording instruments as may be desired can be positioned at any location. On reversing type mills indicating meters are advantageous at both control benches, while on hot mills the meters should be located in the pulpit so that they will be in constant view.

Unusual Operations at G. E. Meter Plant

SOME of the operations involved in the production of meters and other electrical instruments at the West Lynn plant of the General Electric Co. are the handling of wire springs, used in photographic meters, with a diameter of 0.003 in.; winding wire three times as small as these springs into coils for aircraft instruments, and grinding pivots half the diameter of a hair into points sharper than the most perfect needle. The accompanying illustration shows that the needle point, right, is blunt and dull as compared with the pivot point at the left. Both are magnified 125 times.

Many of the operations on the small parts produced in this plant must be performed under magnifying glasses, and the parts must be handled with tweezers.

Springs that are used in various meters are made from bronze wire of 0.003 in. dia., which is passed through rolls and flattened to a thickness of 0.0009 in. After heat treatment in an electric furnace, the springs are tested on a torsion-measuring device that registers the spring torque in terms of millimeters and milligrams.

Though small in size, these parts are required to withstand pressures, as in the case of the pivots, of several thousand pounds per square inch.

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THE needle point, at right, is blunt and dull as compared with the instrument point. Both are magnified 125 times.

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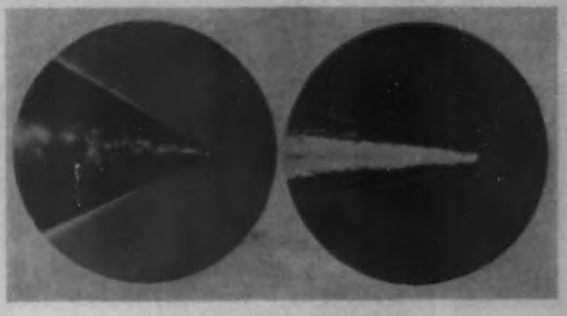

Overhead Conveyors in

CHAPTER 20 of a series on Materials Handling Methods and Equipment

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IN any mass production enterprise in the metal-working field, various operations sooner or later culminate in a process of putting together certain parts into a whole, known technically as "assembly." The automotive industry in particular has so popularized this term that it has become, in just this restricted sense, an essential part of our language. Indeed, today's production operations can hardly be visualized without the "assembly line." And with each passing day bringing a wider acceptance of the principle of continuous flow in production, the assembly line becomes the objective toward which all other manufacturing processes march, as rills and brooks and creeks flow inevitably toward the river which is their common outlet to the sea.

So natural is this all that we are tempted to accept it as a self-evident truth . . . until we remember the industrial plants of our grandfathers and realize with something of a shock that those estimable gentlemen who laid the foundations of our Age of the Machines had literally no conception of the advantages of the continuous flow principle, and that to them the handling of materials was regarded as a necessary evil incident to production, and not the very heart of production itself.

Certainly, long before the automotive industry was full-grown, production engineers visualized the advantages of considering mechanical materials handling equipment as the broad arterial highway along which *planned* production must move to be truly efficient; but actually we waited for the organizing geniuses of that industry to prove how practical the idea might become. And it is undoubtedly to the automotive industry that we must give thanks for the really amazing development of the overhead conveyor . . . one of the most useful devices ever conceived for coordinating the work of parts-assembly.

Fundamentally, the overhead conveyor is a simple piece of mechanism. There are two ways of looking at it. It may be considered as a development of the overhead trolley, in which a number of trolley-carriers are hitched together at regular intervals by an endless chain, so that when one is made to move, all move simultaneously. Or, it may be considered as a lifting of the continuous belt conveyor off the floor into the air, with the capacity of the belt to carry goods on its upper surface replaced by suspended hooks or baskets. Whatever the hundred and one variations of the fundamental principle may be in actual practice, the essential elements consist of (1) overhead suspended trackage, (2) trolleys running on those tracks, (3) carriers suspended from the trolleys, (4) an endless chain or cable connecting all the trolleys together at regular intervals, and (5) means of making the endless chain move continuously, at a uniform rate of speed.

Two factors characterize this combination of elements: (A) the movement of parts or materials handled is continuous, at a constant rate of speed, and (B) the handling, and the means of effecting the handling, are *off the factory floor*, releasing valuable working space for other operations. The first factor may be used as a means of accelerating the pace of production; the second as a means of effecting a more economical concentration of operations. Both are, consequently, vital elements in the problem of reducing production costs to a minimum.

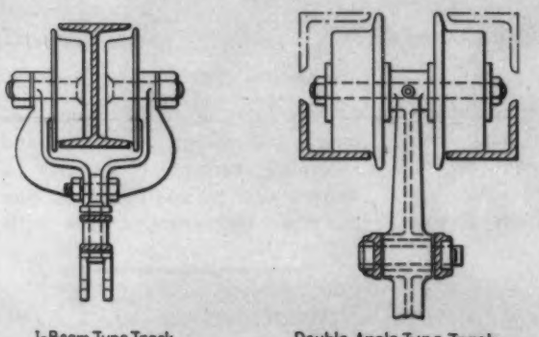

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FIG. 1—The two usual types of overhead conveyor track sections, and the corresponding types of trolleys.

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Overhead Conveyor Design

In any consideration of the application of an overhead conveyor to any particular problem of handling materials or parts, the five elements of design should receive equal attention.

The suspended track may be of I-beam or special tramrail section, or may be built up of two parallel

Assembly Work

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

rails of angle section, separated a uniform distance throughout the entire length of trolley travel. In the first case the pair of trolley wheels are held in a U-shaped frame, clasping the flange of the beam or rail; in the second case the pair of trolley wheels are mounted at the ends of the crossbar of a T-shaped frame, the long leg of that frame dropping down between the two parallel angle rails. Reference to Fig. 1 will make these distinctions clear. It should be noted that in the second case the trolleys may run on the inner flange of the angle sections as shown, or the angle sections may be so placed, back to back, that the trolleys may run on the outer flange. Structurally this latter arrangement gives a more rigid track. In any event, the suspension of the track from the ceiling, or from a special floor-supported framework, should be rigid, and strong enough to support safely all the loads which the conveyor may be called upon to handle. This track may be level, or may incline up or down. At corners, and especially at the points of "return" the bends must be of large enough radius to permit the trolleys to go around the turns easily; that is, without binding.

The trolleys are generally of the designs shown in Fig. 1, or when the track is of angle section, the trolley wheels may be small unflanged wheels, like casters, when they are frequently arranged in sets of four, like a roller-skate. It is usual to equip trolley wheels with anti-friction bearings. Study the action of the trolley wheels on the track, especially on the curves, and note what provision has been made to compensate for wear; of track flange, of wheel tread, and of bearings. Consider likewise the distances the trolleys are spaced apart in relation to the work to be handled, the form of connection of the chain or cable to each trolley and how it will wear, and the method of suspending the carrier from the trolley frame.

The carrier will vary according to the type of work to be handled, all the way from a simple bent-wire hook to an elaborate framework of trays or baskets. There are several hundred shapes of carriers available; if none of them are especially well adapted to the work in hand, it may be advisable to design a special carrier. Bear in mind that it is the carrier and the trolley that actually handles the load. Together they must be strong enough and flexible enough to meet all needs easily, and it is especially necessary to make sure that the carrier itself is so shaped as to make it easy to put loads on the conveyor and to take them

FIG. 2—Mechanical Handling Systems installation in an automobile body painting and finishing department.

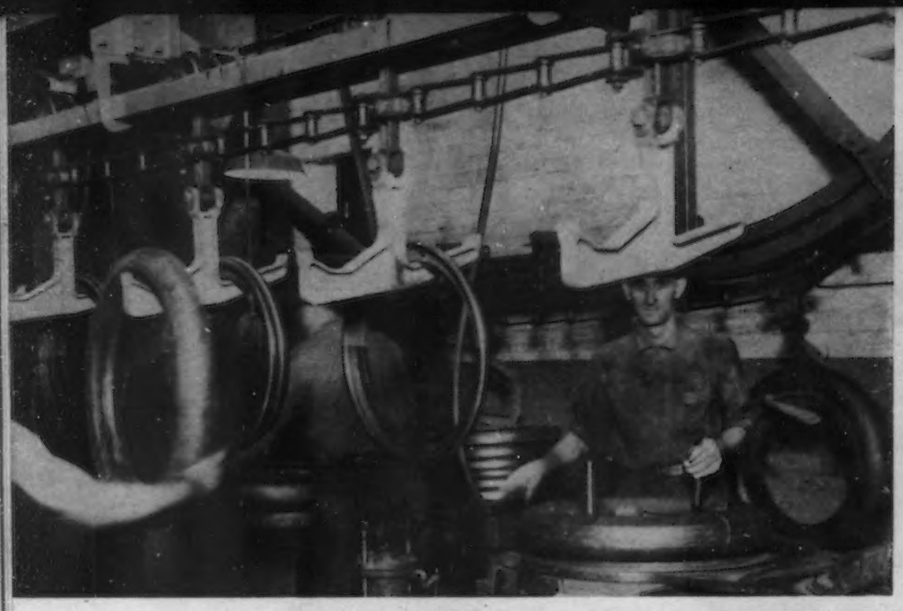

FIG. 3—Chain Belt Co. installation in a tire manufacturing plant.

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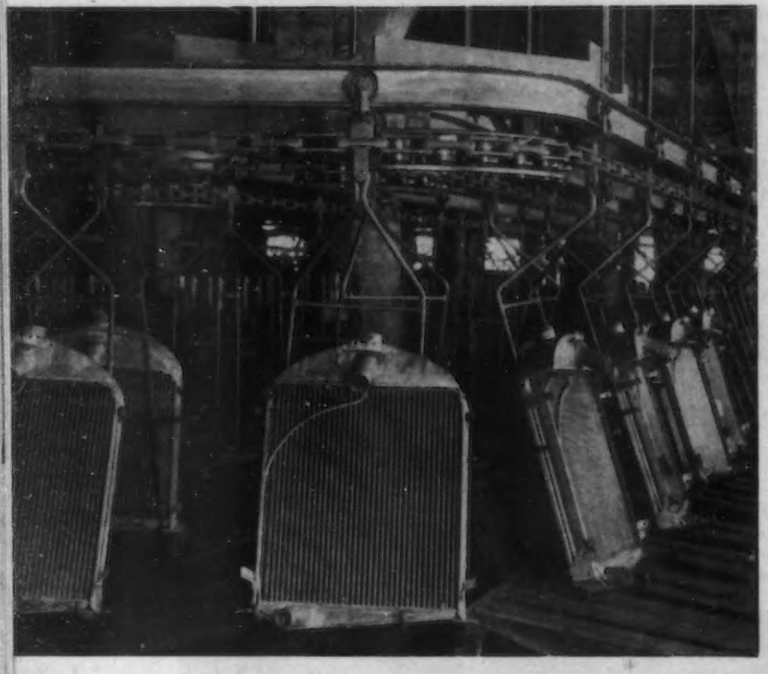

AT LEFT

FIG. 4—Jervis B. Webb installation in testing department of automobile radiator plant.

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FIG. 5—Jeffrey Mfg. Co. installation in a Mid-western automobile headlamp factory.

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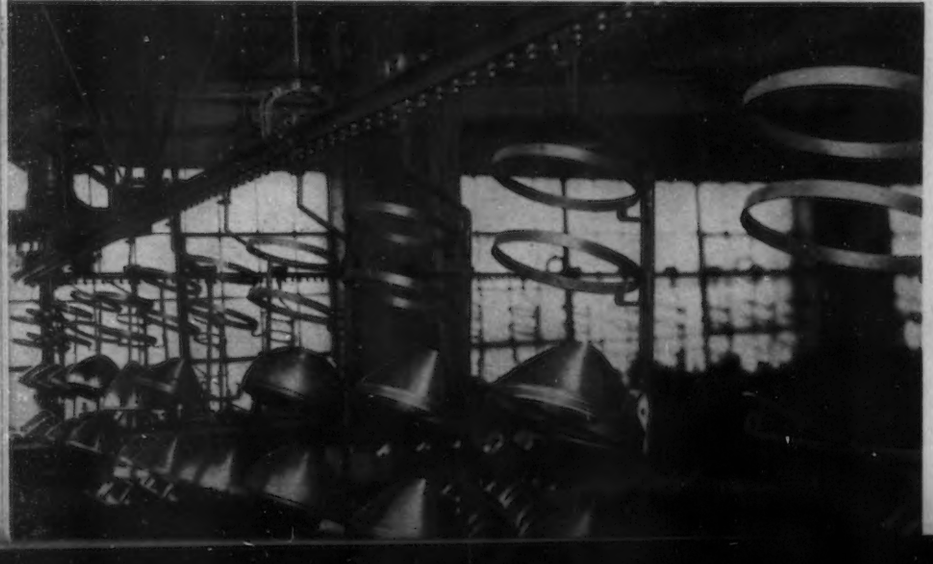


off, without halting the conveyor travel.

The chain or cable is not in itself a carrier. Its sole function is to move all the carriers and their trolleys along the track simultaneously, and at an even rate of speed. But it must be amply strong to insure that continuous motion of all the loaded carriers, and it must be connected to the trolley frames in such a way that it will not bind during travel, and thus cause excessive resistance to movement. Consider the ease with which repairs may be made in case of a breakdown and of maintenance at all times.

The drive should be examined as to *method*, and consideration must likewise be given to the amount of *power* required. In general, the drive is powered with a constant speed electric motor, usually of 1200 r.p.m. speed. The motor drives a gear reducer, often by means of a chain drive which furnishes additional reduction. Where close control of conveyor speed is essential at varying rates, a variable speed transmission is inserted between the motor and the gear reducer, with the control lever actuated from a convenient location. The gear reducer is generally of the worm-gear type, first because of the high ratio of reduction required, and second because it is a right-angled drive mechanism. The screw-gear shaft of the reducer is set vertically, and coupled directly to the conveyor driving sprocket shaft. The driving sprocket is a large toothed wheel rotating horizontally and engaging in the links of the conveyor chain (or it may be a grooved pulley if cable is used instead of chain). Consider the cost of operation of the drive, from the standpoint of the amount of power needed, of maintenance, and of the proper point or points of application.

Certain types of overhead conveyors may be designed to operate partly by gravity; the loads on the forward-moving loaded side running down an incline and furnishing the energy necessary to move the whole line on both the loaded-forward, and empty-return sides, with power applied only at certain "booster" sections to keep the movement constant.

Economic selection of the best types of trackage, trolleys, carriers, connecting chain, and drive,

will in each case depend upon consideration of the type of work to be done the length of travel, the speed of travel, the weight of each load, and whether the work handled is uniform or varied, or will be apt to change in character next month or next year. Lighter equipment is not suitable for heavy work; but heavy equipment may cost proportionately too much to install if the work is light. The two situations are similar to the problem of choosing a truck to handle heavy loads of structural steel over long distances on the one hand, or to handle congested city deliveries of dry-goods store merchandise on the other.

Conditions of Use

A brief inspection of the accompanying illustrations will show many of the conditions of use more clearly.

In Fig. 2 a Mechanical Handling Systems, Inc., installation is shown in the body painting and finishing department of an automobile plant. Each body is held in a cradle suspended by two carriers of the conveyor system. Lighter, intermediate trolleys support the chain between the load-carrying trolleys. On such a line the movement may be very slow but constant; or it may be intermittent, with pauses at each station for predetermined periods, than a forward movement to the next station. Either way, each operator is assigned a single, definite task, so planned that it may be completed within the period during which the work is in front of his station. Notice that from the fifth body forward, counting from the left side of the picture, each body has been lowered, to permit the operators to reach the roofs of the bodies. The conveyor track is of modified I-beam section, and the trolley-wheels ride on the upper side of the lower flange of the beam.

In Fig. 3, a Chain Belt Co. installation in a tire manufacturing plant, the conveyor track is formed of parallel, separated angle-section rails. The trolley-wheels ride on the upper side of the facing flanges of these angles. Each carrier is designed to carry a shoe on one side and a metal rim-form on the other. At the station, an operator removes both pieces from the carrier, places them on the hydraulic press, and when the

FIG. 6—Mathews Conveyor installation in the pickling house of an axle-housing plant. o o o

BELOW

FIG. 7—Chain Belt Co. installation in automobile plant, bringing fenders from storage to the assembly line. o o o

BELOW

FIG. 8—Jeffrey Mfg. Co. installation in a factory making radiator and gas tank caps for automobiles. o o o

AT LEFT

FIG. 9—Chain Belt Co. installation in a domestic washing machine plant.

o o o

BELOW

FIG. 10—Jervis B. Webb installation handling enamelled parts used in the assembling of domestic gas stoves.

process is completed, removes the shoe to the single hook carrier of the return conveyor in back of him.

Fig. 4 is a Jervis B. Webb Co. overhead conveyor installation in an automobile radiator plant. This is in the testing department, where each radiator is subjected to a liquid pressure test, after the assembly has been completed, and before the painting is done. Two points worth especial notice are: the sharp bend in the conveyor track, and the sling-frame type of carrier holding each radiator. The simplicity of the framework supporting the I-beam section track is likewise of interest.

A Jeffrey Mfg. Co. overhead conveyor in a mid-western automobile headlamp factory is shown in Fig. 5. Each carrier has four rings, each designed to hold one lamp-body. Here the track assembly is of angle-section, but arranged in the reverse fashion to that shown in Fig. 3. The flanges are on top of the assembly; the trolley wheels have no flanges, but are coupled roller-skate fashion. The track supporting clamps are extremely simple forms, and the threaded rods which hold them up permit of adjustment of the track-level up or down. Every other clamp is held by two rods so placed as to brace against side-sway.

Fig. 6 is likewise automotive in character. It is a Mathews Conveyer Co. installation for handling axle housings through pickling tanks. The wire carriers support each housing in a horizontal position transversely to the line of conveyor travel. In the background, two conveyor lines are shown rising from a lower level, outside the pickling building. In the foreground, on either side, each line dips down to the pickling tanks, then rises again to let the housings drip clean. At the top of the picture a conveyor drive is shown, with the large spur-gear which in this case has been substituted for the more usual worm-gear reducer.

In Fig. 7 is shown a clearer view of another drive. This is a Chain Belt Co. installation, bringing fenders from storage to the assembly line in an automobile plant. Light, bent-wire hooks, passed through rivet holes in the fenders, form the carriers. In the drive a constant speed induction motor is connected by a chain to a Lewellen variable speed transmission, the output shaft of which is connected by a second chain drive to the worm-shaft of a vertical worm-gear reducer, the screw-gear shaft

of which is directly coupled to the conveyor drive sprocket shaft. A metal band encircling part of this sprocket serves as a safety guard.

The Jeffrey Mfg. Co. installation shown in Fig. 8 is in the plant of a manufacturer of metal caps for automobile radiators and gas tanks. The essential flexibility of an overhead conveyor system is well illustrated here. The conveyor line comes from around the corner of the wall in the upper right of the picture, and dips down to the operator's bench in the left foreground. Note especially the unique shape of the tray-carriers. Being supported at one side only, they permit the workmen to put trays onto and take them off the carriers more readily than if the carriers were supported on both sides.

In the Chain Belt Co. installation shown in Fig. 9 an excellent view is to be had of a "return bend" in an overhead conveyor system, and likewise of a "quarter-turn bend." These sprocket wheels are both idlers; the conveyor is driven from another point. The conveyor track is formed of parallel angle sections, with the trolley wheels running on the upper side of the flanges. The work being done here is that of attaching and riveting legs to domestic washing machine bodies. The bodies are carried upside down on a gravity roller conveyor, the legs on the overhead chain conveyor. Each hook carrier carries two legs, which the operator removes from the hook by simply lifting a few inches. The suspension of the conveyor track in this case is particularly rigid as considerable weight is carried at times.

The Jervis B. Webb Co. installation shown in Fig. 10 is in a large domestic range plant. The carriers are in the form of cradles of four trays each, on which the enameled parts are laid, and over which there is a canopy to protect the parts from dirt and grease.

These illustrations are typical of the wide range of uses to which overhead conveyors may be adapted in parts assembly work.

Steel Creep Studied By U. S. Steel

THE manufacture of steel products that undergo tension at elevated temperatures will leap a bothersome hurdle if the creep, or stretching of these metals can be successfully controlled.

In the Kearny, N. J., laboratory of the U. S. Steel Corp., specimens of various types of steel have been undergoing creep tests for some time. Each specimen is 0.5 in. in diameter and 2 in long, and is placed under tension at a temperature of 1100 deg. F. and held that way for a period of 3000 hours. Twice a week the specimens are measured for creep.

The results of the tests to date, which were discussed in a paper presented before the recent meet- of the American Society of Metals in Atlantic City, N. J., indicate that differences in creep behavior and in mechanical properties are definitely associated with differences in microstructure. The tests have also suggested that special methods of heat treatment may make it possible to control the creep characteristics of certain steels.

In the accompanying illustration a metallurgist is shown making a reading on one of the specimens.

September Auto Output 175,620

WASHINGTON, Nov. 9.—Production of automobiles in the United States and Canada in September totaled 175,620, compared with 405,064 in August, 1937, and 135,130 in September, 1936.

For the nine months ended Sept. 30 the total was 3,910,418, compared with 3,336,296 in the first nine months of 1936.

Pittsburgh Steel Co. stockholders last week elected A. E. Walker, vice-president, to the board of directors. Members reelected Frank F. Brooks, Charles E. Beeson, Albion Bindley, T. W. Friend, J. H. Hillman, Jr., George T. Ladd, Henry J. Miller, George P. Rhodes, W. H. Rowe, Jr., W. C. Sutherland and Henry A. Roemer, president.

Buildings That Tell Their Own Production Story

By ALBERT S. LOW

Vice-President and Chief Engineer, The Austin Co.

o o o

INDUSTRIES expanding their production, warehousing and research facilities to meet expanding market needs are capitalizing on their plant improvements in more ways than one. Industry is placing greater emphasis on the modernity of production methods and equipment than ever before, probably because it recognizes that the buying public assumes the greatest useful value in products from the most efficient plant. It is seldom, however, that the manufacturer finds opportunity to tell the public the story of his own products through additions to the very plants which make them.

Three leading producers of building materials and equipment have dramatized their own prod-

o o o

AT LEFT

INSULATED steel walls have been used in partitioning the research laboratories in the new Armco research building. This view shows how inside rooms gain daylight illumination through walls of glass block 10 ft. high in saw teeth which are spaced 30 ft. apart.

o o o

CLEAN as a gun barrel are the aisles in this all-welded rigid frame factory recently completed at Cleveland for the Lincoln Electric Co. It utilizes welded tree-form columns designed by the Austin Co. and prefabricated from plate and wide flange I-beams in its structural shops to open up well lighted working areas which are unobstructed from floor to roof.

PORCELAIN enamel, stainless steel and glass symbolize the results of past research in this new research laboratory building for the American Rolling Mill Co. at Middletown. The Austin Co., which designed and erected the building, has used eleven Armco products in the construction of the walls, roof and partitions.

AT RIGHT

SCIENTIFIC lay-out of the corrugated container factory and warehouse recently completed by the Austin Co. for the Owens-Illinois Glass Co. at Gas City, Ind., is reflected by the functional arrangement of more than 42,000 glass bricks in panels, which indicate the interior plan. Eight huge horizontal panels extending along the 541-ft. east wall admit abundant glareless daylight all along the corrugating and box production line which occupies the second floor. The panels, 61 ft. 5 in. wide and 8 ft. 7 in. high, are the largest independent exterior sections of glass brick up to the present time.

ucts in striking fashion in industrial buildings recently completed.

Long experience in the construction of welded buildings had led our engineers to develop an entirely new type of welded rigid frame factory construction, employing "tree-form" sections to provide unobstructed head room from floor to roof in sawtooth buildings. When this design was called to the attention of the Lincoln Electric Co., contemplating extensive additions to its arc welding equipment plant, its executives promptly recognized an unusual opportunity. Here was a ready-made pattern in which welding was the all-important factor, all the members being fabricated from plate and standard structural sections in a manner impossible by any other process.

Confronted by ever-widening markets for its arc welding equipment but some resistance to the incorporation of welding specifications in the building codes of the less progressive cities, the Lincoln management had long recognized a definite need to make any plant additions striking demonstrations of all the things which structural welding had to offer—speed, economy in steel required, and silence in erection. The sawtooth pattern had been developed with a view to quantity production of its standardized sections and our fabricating shops were equipped to turn out the necessary members for 100,000 sq. ft. of building in four to six weeks. Furthermore, an 80-ft. "cathedral" bay offered an unusual opportunity to demonstrate the economies of welding, and proximity of a golf course and residential suburbs made the elimination of noise a factor of considerable importance. The result was a building that grew up from the drawing board to completion in 100 working days, providing 200,000 sq. ft. of floor space with every modern fitting consistent with the functions which the plant itself must serve. One huge cathedral shop, 240 ft. x 80 ft., has all the grace of a Norman cathedral, its broad girders curving downward to meet the wide flanged columns which curve to meet them at the top. So impressed were the Lincoln executives with the application of their own welding technique that they scheduled their sales convention in this room which was intended as a shop.

Their decision was more timely than they realized, for while this revolutionary structure was in process of construction the New York building code, long pending before Gotham's board of aldermen, was passed with welding authorized among its new provisions.

Equally dramatic in the telling of its own product story is The American Rolling Mill Co.'s new research building at Middletown, Ohio. Here again we were called upon for pioneering use of modern structural materials, in the development of which Armco has played a leading role. Experience in the construction of prefabricated service stations utilizing porcelain enamel sections with cellular steel walls had made us

(CONTINUED ON PAGE 101)

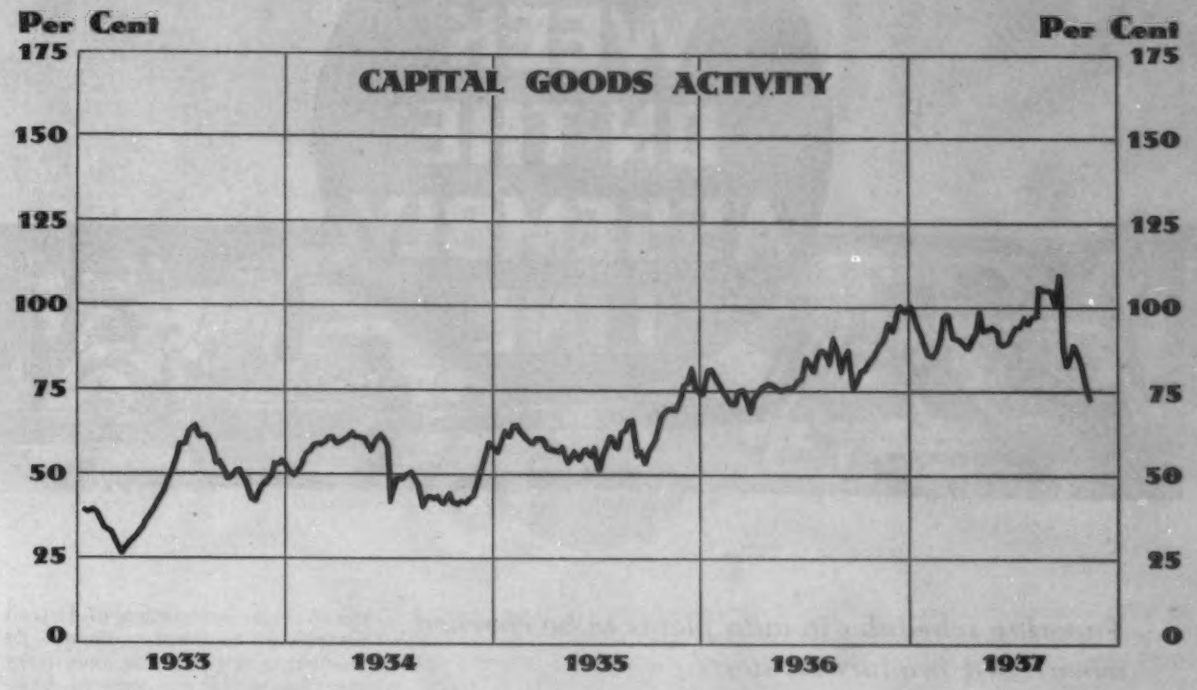
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

	September 1937	August 1937	September 1936	Nine Months 1936	Nine Months 1937
Raw Materials:					
Lake ore consumption (gross tons)[a]	5,157,411	5,373,264	4,026,690	31,434,081	45,141,121
Coke production (net tons)[b]	4,679,875	4,829,862	3,990,700	33,095,400	41,736,671
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	3,410,371	3,605,818	2,711,721	21,564,508	30,221,640
Pig iron output—daily (gross tons)[c]	113,679	116,317	91,010	78,703	110,702
Castings:					
Malleable castings—production (net tons)[d]	52,728	49,022	46,552	407,310	499,084
Malleable castings—orders (net tons)[d]	41,652	49,376	44,361	395,626	467,239
Steel castings—production (net tons)[d]	83,047	92,089	76,617	578,427	858,675
Steel castings—orders (net tons)[d]	57,414	54,753	56,877	613,825	778,874
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,301,869	*4,875,671	4,151,388	33,526,142	42,498,769
Steel ingot production—weekly average (gross tons)[e]	1,005,110	*1,100,603	969,950	856,570	1,089,712
Steel ingot production—per cent of capacity[e]	76.52	*85.79	74.05	65.40	83.12
Finished Steel:					
Trackwork shipments (net tons)[e]	8,101	7,530	5,722	52,931	77,891
Fabricated shape orders (net tons)[g]	117,859	117,612	118,158	1,189,878	1,315,240
Fabricated shape shipments (net tons)[g]	154,295	158,228	145,521	1,135,598	1,237,139
Fabricated plate orders (net tons)[d]	31,484	*31,783	35,033	358,763	341,972
U. S. Steel Corp. shipments (tons)[h]	1,047,962	1,107,858	961,803	7,867,707	10,956,846
Ohio River steel shipments (net tons)[i]	122,600	133,650	95,705	785,381	1,007,645
Fabricated Products:					
Automobile production, U. S. and Canada[k]	175,620	405,064	139,820	3,461,468	3,910,418
Construction contracts, 37 Eastern States[l]	$207,071,800	$285,104,100	$234,271,500	$2,041,628,000	$2,307,014,300
Steel barrel shipments (number)[d]	725,699	771,427	795,746	6,047,000	7,538,467
Steel furniture shipments (dollars)[d]	2,083,919	$2,022,913	$1,549,808	$13,710,553	19,888,435
Steel boiler orders (sq. ft.)[d]	661,372	917,927	892,027	7,733,136	8,001,924
Locomotive orders (number)[m]	8	39	24	158	278
Freight car orders (number)[m]	1,195	1,490	3,100	37,348	47,805
Machine tool index[n]	210.7	179.8	118.5	†132.0	†187.2
Foundry equipment index[o]	231.8	257.5	161.0	†155.3	†231.2
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	37,071	61,489	59,993	487,766	444,086
Imports of pig iron (gross tons)[p]	7,911	7,952	15,080	137,607	84,038
Imports of all rolled steel (gross tons)[p]	13,796	26,982	28,618	200,240	238,540
Total iron and steel exports (gross tons)[p]	542,740	886,319	235,051	2,452,935	5,861,264
Exports of all rolled steel (gross tons)[p]	213,990	286,774	73,949	790,001	1,808,743
Exports of finished steel (gross tons)[p]	173,902	202,949	65,530	716,084	1,496,151
Exports of scrap (gross tons)[p]	252,713	473,933	152,312	1,585,155	3,281,508
British Production:					
British pig iron production (gross tons)[r]	726,600	712,600	650,800	5,696,800	6,159,500
British steel ingot production (gross tons)[r]	1,163,000	987,700	1,027,000	8,618,000	9,548,300
Non-Ferrous Metals:					
Lead production (net tons)[s]	41,046	46,965	32,982	330,115	387,641
Lead shipments (net tons)[s]	53,850	54,551	50,685	351,806	468,768
Zinc production (net tons)[t]	50,027	48,309	42,210	384,331	436,107
Zinc shipments (net tons)[t]	47,737	50,643	51,775	391,607	467,545
Deliveries of tin (gross tons)[v]	8,245	7,580	6,200	55,725	65,240
Copper production, refined (net tons)[w]	90,982	*82,835	75,892	528,230	740,893

†Three months' average. * Revised.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census. [l] F. W. Dodge Corp.; [m] *Railway Age*; [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange; [w] Copper Institute.



The Iron Age Weekly Index of Capital Goods Activity

(1925-27 = 100)

Last week	72.2	Same week 1934	42.0
Preceding week	75.8	Same week 1933	41.9
Same week last month	88.3	Same week 1932	34.1
Same week 1936	86.6	Same week 1931	49.2
Same week 1935	69.7	Same week 1930	70.9

Same week 1929 ..... 112.9

CONTINUING its downward movement, THE IRON AGE seasonally adjusted index of capital goods activity declined 3.6 points for the week ended Nov. 5, and now stands at 72.2 per cent of the 1925-27 average. The slight decline in the week's automobile assemblies was accentuated when adjusted against the rising seasonal trend, and the index for this component now stands at 85.8, as against 94.6 in the previous week. Further curtailment in industrial production and originating shipments in the Pittsburgh area forced the index for this series down to 72.7, a loss of 4.3 points from last week's level. Although the short holiday week caused the dollar value of heavy engineering awards to drop to the lowest point reached this year, the average weekly volume for the year to date is still eight per cent above the average week of 1936. The index figure for this factor now stands at 45.5, as compared with 47.2 in the previous week, and 47.8 six months ago. The only component of the index to register a gain was carloadings of lumber products, which gained 3.4 points after seasonal adjustment.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	48.0	—3.0
Automobile production (number of cars and trucks)	89,770	—385
Railroad loadings of forest products (number of cars)	34,477	+1,594
Pittsburgh industrial production and shipments (index number)	72.7	—5.3
Construction contracts awarded (total value)	$22,427,000	—$40,439,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

THIS WEEK ON THE ASSEMBLY LINE

. . . Tapering schedules in auto plants to be checked when Ford production starts.

o o o

. . . Hand-to-mouth buying more pronounced; purchasing agents declare prices are falling.

o o o

. . . Ford press shop awards made; other new projects spur hopes of building industry.

o o o

. . . Union unrest and calls for strike votes follow CIO election defeat.

DETROIT, Nov. 8.—After two successive drops in weekly production the automobile industry looks now to the promise of the start of volume operations this week by the Ford Motor Co. Expectation of exceeding the 100,000 mark is general and may temporarily cheer industry. However, we still are faced with the fact that some manufacturers are tapering schedules. Indications are that after a temporary increase, output will follow a slowly declining path pending more active retail buying of automobiles. The Detroit Auto Show, opened last Saturday, will be watched as a further indicator.

Output of automobiles in the United States and Canada totaled 89,770 last week compared with 90,155 the preceding week and 91,905 the week ended Oct. 23. This compares with 81,780 units a year ago at this time, so there still is the consoling fact that even now conditions are better than a year ago when the upward swing was on.

According to Ward's Automotive Reports, last week's loss in output was spread uniformly throughout the industry. Production of General Motors dropped to 46,215 from 46,537. Chrysler slipped off from 27,775 to 26,000. Even Ford showed a slight loss to 1250 from 1275. Activity of other makers counterbalanced some of these losses. Summary of the first nine months' passenger car sales by R. L. Polk & Co. shows 2,879,743 compared with 2,660,675 the first nine months of 1936. Truck and commercial car sales totaled 513,328 compared with 492,720 for 1936.

As October ended, the Purchasing Agents Association of Detroit completed a survey among its members with results not very cheerful so far as general business conditions are concerned. According to L. G. Auberlin, executive secretary, who has his fingers on the pulse of nearly 100 Detroit concerns, most of them in the metalworking trades, hand-to-mouth buying was back at the level of 1934 and 1935 in October. Twenty-three per cent of purchasing agents reporting to the association said that they bought only to meet present needs. Another 27 per cent made 30 days their outside limit, so that half were within the one-month group. Another 23 per cent reported buying as extended as 60 days and the final 27 per cent were optimistic enough to buy 90 days in advance.

Reports of inventories higher than a month ago totaled only 9 per cent. Fifty per cent had maintained the status quo. But 36 per cent had reduced inventories from the preceding month. These buyers for industry keep close tab on commodity prices, and 36 per cent found prices lower than in September. Sixty-four per cent have noted no change, but none reported higher prices. They also had interesting observations on credit and collections. While up to now they have been reporting money plentiful, 82 per cent of those who answered at the end of October said that "credit still is ample," 5 per cent said "slow" and 5 per cent said "tight." Collections were the same as a month ago for 77 per cent of the firms, less than the preceding month for 18 per cent.

Their analysis of general busi-

ness conditions is summed up by 41 per cent of the purchasing agents who said "no change," another 41 per cent who found conditions worse and 18 per cent who noted an improvement. Employment in their firms had decreased in 59 per cent of the cases, remained unchanged for 36 per cent and increased for 5 per cent. This, to an observer, seems to be closer to the facts than the last employment index figure of the Board of Commerce, which showed an increase of 4.1 points at the end of October, when the index reached 124.9, but this indication is not entirely accurate because on the final working day, Friday, Oct. 29, the effect of layoffs and short work weeks had not become apparent. However, as reported last week, one automobile manufacturer sent home 1000 employees that Friday night. Smaller production figures for the past week reflect the general reduction in schedules among the automobile companies, which now have large numbers of production workers active only four days each week.

Inventories Being Reduced

As indicated by the survey, suppliers have cut inventories to the bone. Kelsey-Hayes Wheel Co., for instance, passed out the word last week to its vendors to stop fabrication on all stock immediately. This crder covers parts for Ford, Chevrolet and several other manufacturers. Underlying the situation in Detroit is the reported reaction at the New York Show and the fact that in some cases dealers still have 1937 cars on sale at reduced prices.

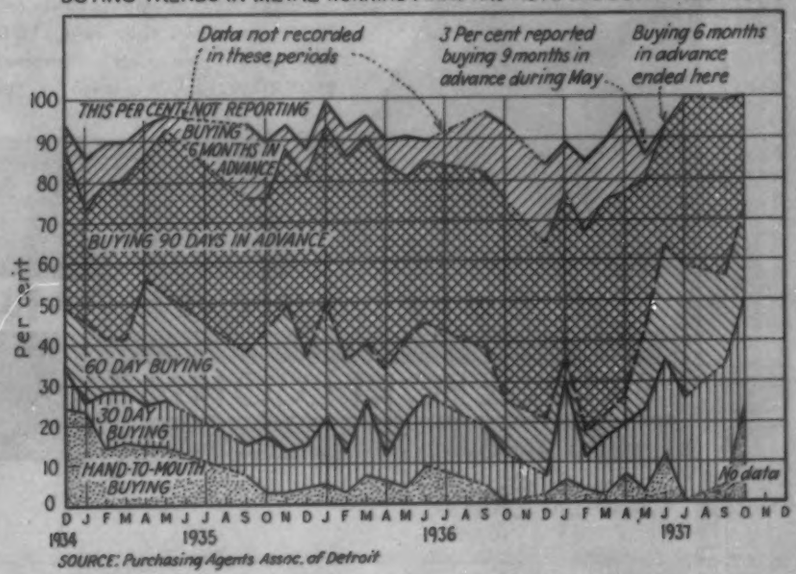
The new model "season" is not entirely over yet. Willys has just announced a new half-ton truck of the cab-over-engine type. The body frame is all-steel and the panels are of plymetal. In the introduction of this unit, as well as that of a light delivery commercial car recently, Willys is following the plan started with its passenger cars, entering the marginal price position. It expects considerable volume. Incidentally, Nash will enter the truck manufacturing field next spring. Its Kenosha plant is now being prepared for production. In the heavier truck line, the Diamond T Motor Car Co. is contemplating expansion on 12 acres recently purchased. The company has also purchased the plant it now occupies, a factory rented 20 years ago.

Last week awards were made on contracts totaling 45,000 tons of steel for the new Ford press shop. Delivery of 20,000 tons of piling will be started within a few weeks by Carnegie-Illinois Steel Co. Some of this will be driven as deep as 105 ft. into the ground to support the heavy equipment to be installed later. Shortly after the first of the year, the American Bridge Co. will begin delivery of 25,000 tons of structural steel to be erected within six or seven months. The structure will be L-shaped, 1660 ft. long with a 600 ft. secondary part. Altogether, there will be 750,000 sq. ft. of floor space.

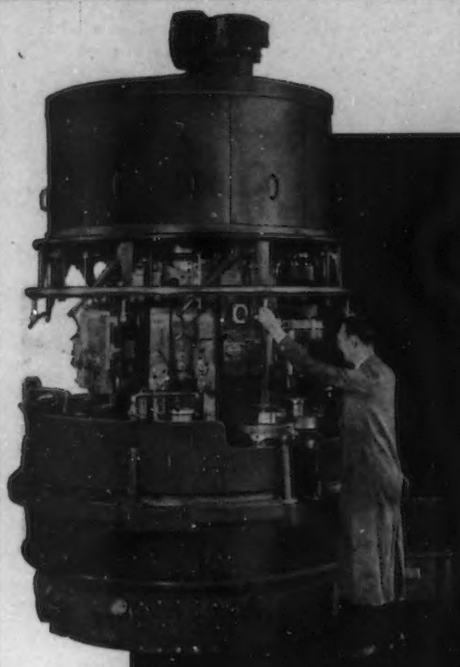
New Construction

Production began Thursday at the new $3,300,000 body manufac-

BUYING TRENDS IN METAL-WORKING FIRMS AND AUTO INDUSTRY (DETROIT)



SOURCE: Purchasing Agents Assoc. of Detroit



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turing plant erected by Ford in Windsor. This structure, the largest industrial building constructed in Canada in 1937, is 1000 x 571 ft., providing 571,000 sq. ft. of floor space. The plant is the largest unit in the $8,000,000 expansion schedule for Ford of Canada. Incidentally on March 1 next, the required Empire content in automobiles manufactured in Canada will be stepped up from 60 to 65 per cent and the Canadian auto plants are conforming as rapidly as possible through the installation of more manufacturing facilities.

Construction of an entirely new plant for the production of fractional horsepower motors will be undertaken soon by the Sunlight Electrical Division of General Motors at Warren, Ohio. This plant will be one story and 500 x 240 ft. Plans for the structure are well under way and it is hoped that contracts will be let in time to complete construction by March 1. The present property probably will be vacated, but no decision has been made regarding its disposition. This is the third major expansion of General Motors units at Warren within the last two years.

The Malleable Iron Division of General Motors at Saginaw, Mich., will begin construction of a small building about Dec. 1 to house the personnel staff.

A New Forge Plant

One of the oldest forging men in the business, Alex A. Motherwell, is directing the expenditure of approximately $90,000 to equip a new forge plant at Pontiac. His new concern, the Motherwell Mfg. Co., will occupy the old plant of the Eaton Axle & Spring Works. It will begin operation with six drop forge hammers ranging from 1000 to 3500 lb. The shop will also be equipped for the machining of forgings and for heat treatment, with production starting Jan. 1.

Motherwell has had an interesting career in the automotive area. He holds the patents on dies used for forging six-throw crankshafts without twisting. He built the Buick forge plant in 1908 and directed the Chevrolet forge plant through its first days in 1918, staying with General Motors until 1926. A. E. R. Schneider, of Cleveland, who originated the practice of shipping automobiles on the decks of bulk freighters on the Great Lakes to save freight charges, is vice-president of the new company.

Expenditure of $275,000 is contemplated in Toledo for two new buildings. The Great Lakes Coca-Cola Bottling Co. has a $125,000 plant under construction and the University of Toledo plans a $150,000 dormitory.

Engines for light planes produced in large quantities by Continental Motors Corp. are undergoing final steps of a complete redesigning. It is understood that the first of the year the present 40-hp. Continental engine will be replaced by a 50-hp. engine of greater efficiency and less weight.

At Chrysler the diesel for truck engines is receiving a lot of attention with experimental work on injectors and valves believed to be in its final stages. Entirely new engines are being designed for the 1939 Plymouth and Dodge. Ford Motor Co., before long, will be using a new sandless casting process, it is understood.

More space for research on rustproofing problems is being provided by Parker Rustproof Co. through the addition of a two-story laboratory and office building, 148 x 152 ft., which will have new laboratory equipment. In addition, the space will be devoted in part to a sheet metal shop and storage of rustproofing chemicals.

It is predicted that the strike fever will break out again in Michigan. Union unrest was curbed by CIO officers while a municipal election campaign was on, but already a strike vote has been taken at the Pontiac plant, and the Plymouth factory saw strike vote notices posted, then torn down Thursday night. Here it appears that international officers stepped in to delay action pending the outcome of General Motors conferences on contract adjustments. United Auto Workers from all General Motors locals will hold a strategy conference this week-end and it has been said unofficially that the union is intent on having the final agreement with General Motors ready to present to delegates Saturday.

The Plymouth affair may be expected to come to a head about Nov. 20 and depends largely upon the outcome of the General Motors negotiations. Meanwhile, the UAW has filed formal complaint against Chrysler Corp., charging violation of the Wagner Act by supporting a company union. Members of the Chrysler Independent Union have been beaten up several times and are now going to and from work under special guard.

IN the making of automobiles, rarely do even Detroiters see behind the scenes where Chevrolet has this "machine that makes machines," which must be kept in top-notch condition to insure that its work will have a high standard of accuracy in manufacturing parts. This crankshaft, weighing nearly half a ton, is part of a 600-ton coining press used at the Gear and Axle Plant to shape brake drums. The bearing surface is turned to within 5/10,000 in. limit.

WASHINGTON . . . . . .

. . . Nation awaits President's coming maneuvers to check industry's decline, get business on high road to recovery.

° ° °

. . . New Deal mania for taxing, spending, heckling, regimenting gets heaviest blame from opponents of Roosevelt.

° ° °

. . . Action by Interstate Commerce Commission on railroads' request for freight rate increase may be expedited.

° ° °

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

° ° °

WASHINGTON, Nov. 9.—With the President back in Washington, hearings on revision of the Federal tax structure begun and Congress scheduled to convene in special session next Monday, the country is eagerly awaiting New Deal maneuvers to check the recession in business and get business on the high road of recovery.

Manifestly that is the subject of chief concern to the Administration despite efforts to conceal its nervousness over the decline in production, employment and sales in steel and other basic industries. The subject plainly tops the program of farm, wage-hour and Government re-organization legislation, the purposes for which the President called the special session.

Whatever may be done these issues have been pushed to a secondary position by the break in industrial activity, led by the letdown in steel production and followed by declining demand in other lines with abrupt reaction in the stock market.

Tried "Silent Treatment"

At first the Administration sought to ignore the sharp plunge in the market or treated it casually, but it was soon seen that the situation involved portents of a major proportion and that the jittery feeling of the nation was growing and could not be downed by a pose of serenity.

However, the Administration wisely did not engage in a broadside of optimistic statements which might emphasize the feeling of uneasiness. That was Mr. Hoover's experience.

While the Administration has indicated that this feeling has been overplayed and is unwarranted, a view that many industrialists share, nevertheless it is agitated and has held and is holding conferences looking to a remedy. The only concrete thing done so far was by the Federal Reserve Board in lowering margin requirements. This move was stimulating as shown by the buying move on the Stock Exchange.

Government Blamed

But the trouble lies much deeper. Widespread blame is laid at the door of the Government itself for its policies. Its mania for unsound regimentation, tremendous spending of unprecedented proportions, the budget increasingly more unbalanced, excessive taxation on and heckling of business, all in the name of high sounding objectives, finally brought about the inevitable reaction.

It now is a matter of speculation whether this condition will mean a sharply altered policy, one that realizes its realities and one that faces them. Outstanding is the immediate question of tax revision which certainly is of greater concern to the country at large than is the legislative program the President has announced for the special session. Shoving that program to a relatively minor position and giving taxation relief first consideration clearly would meet with popular approval and undoubtedly would be an accelerating force toward restored business confidence and recovery. But no action on tax legislation is expected before the regular session beginning in January. The demand for action, especially by way of revision of the burdensome business-retarding taxation on undistributed profit and capital gains has reached a high note. By no means does it come from business alone. Even in the New Deal itself the demand is insistent.

Labor Urges Action

Labor groups, seeing the vital importance the revision would have on maintaining employment and wages, are urging action. Members of Congress, including New Dealers, are reported to be ready to ask that these taxes be quickly lightened even if the Administration should hold out against the move.

It was the uppermost subject in mind when the subcommittee of the

VALLEY MOULD AND IRON CORPORATION

GENERAL OFFICE HUBBARD, OHIO

House Committee on Ways and Means began hearings behind closed doors on revision of the Federal tax structure, with Treasury experts presenting the opening testimony. Undersecretary of the Treasury Magill indicated that the Treasury recognizes the need of tax revision.

However, there is uncertainty as to just what revisions will be made. Both the Administration and leaders in Congress have been non-committal, the President himself remaining silent. Chairman Fred M. Vinson of the subcommittee, when asked if the tax would be revised with a view to relieving burdens on business, would make no predictions at this time though he said, "we want to be as helpful as we can." He expressed the hope that the results will be "helpful."

It was Mr. Vinson who proposed "cushions" in the bill when it originated in the House. They were practically done away with by the Senate. Mr. Vinson said that he recognized the necessity of relieving hardships complained of by big and little business men.

Among important subjects being considered by the subcommittee are:

Relief for debt-ridden and deficit corporations.

New exemptions for companies having contracts not to pay dividends.

Assistance to financially weak concerns just coming out of reorganization or bankruptcy.

Further aid to small business enterprises seeking to expand.

Exemptions for plant improvements and extensions as an aid to business recovery.

Demand by members of Congress for relief in taxation on undistributed profits actually has come from numerous Democratic as well as Republican sources. Such suggestions were made by Senator Carter Glass, and Senator H. F. Byrd of Virginia, and Senator James F. Byrnes of South Carolina last week along with other prominent Democrats who came forward with similar views.

Representative Frank H. Buck, Democrat of California, a member of the Ways and Means Committee, reported that he had found widespread opposition to the undistributed profits tax principally because it prevents new corporations from expanding and hampers expansion of old ones. Also he said the tax is opposed because it does not provide a cushion for corporations suffering from debt.

Relief Plunges Dangerous

Some labor groups, seeing that many plants already are laying off men, are apprehensive because the tax deprives corporations of surpluses which heretofore were used for relief for idle workmen or to provide them with part-time employment. It is realized that, if it is to escape bankruptcy, the Federal Government cannot long plunge further in financing relief.

Senator Frederick Van Nuys, Democrat of Indiana, has announced he is drafting an amendment to the 1936 Revenue Act to end some of the injustices suffered from the undistributed profits tax. Senator Van Nuys said a personal check of the Senate Finance Committee and of the Senate itself has convinced him that the Senate will amend the law regardless of Roosevelt's attitude. Authored by the Indiana Senator, the amendment may be frowned on by the President, but if presented by some orthodox New Dealer it might be given more favorable White House attention, for the Indiana Senator is in the White House dog house because of his bitter opposition to the Court packing plan.

Tax Seen A Curse

That there are important Government sources which consider the undistributed profits tax a curse is clear from an incisive paragraph the Interstate Commerce Commission incorporated in its annual report for 1936. It reflected plainly the tax dangers to financially weak railroads. The report said the commission has been requiring estab-

Small Hole Grinding

Mounted wheel held in chuck grinding small bore with spindle turning at 35,000 r.p.m.

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THE Rivett No. 104 Grinder is designed to meet demand for a small hole grinder suitable for precision tool making and accurate manufacturing. It may be used as a single purpose machine in efficient production or readily and rapidly set up for the many varying requirements of the toolroom. Correct in proportion and design the extremely high spindle speeds necessary for small hole grinding can be maintained within the required limits absolutely free from vibration.

Although primarily an internal grinder, an external grinding attachment can replace the internal spindle bracket. The Rivett fixed diamond method is used for truing both internal and external wheels to maintain sizes on duplicate parts. For further information write for bulletin 104-C.

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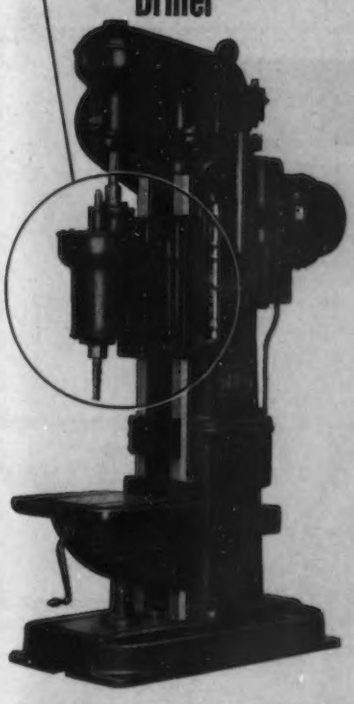
NATCO B-225H

For Rapid Drilling in Small and Medium Sized Work

This Hydraulic Feed Machine Can Be Converted Into 3 Types

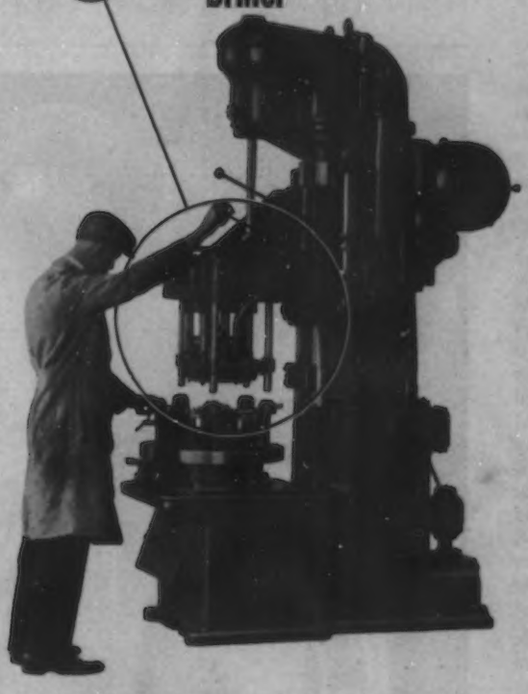
1 Single Spindle Driller



Capacity, One 1½" Drill in Steel

The NATCO Model B-225H machine shown above is equipped with a single spindle slow speed head for boring operations. This type of machine may also be arranged with a standard single spindle head for normal drilling if desired. Equipped with either type of head and complete with an adjustable table, this machine may be used on a wide variety of single spindle work.

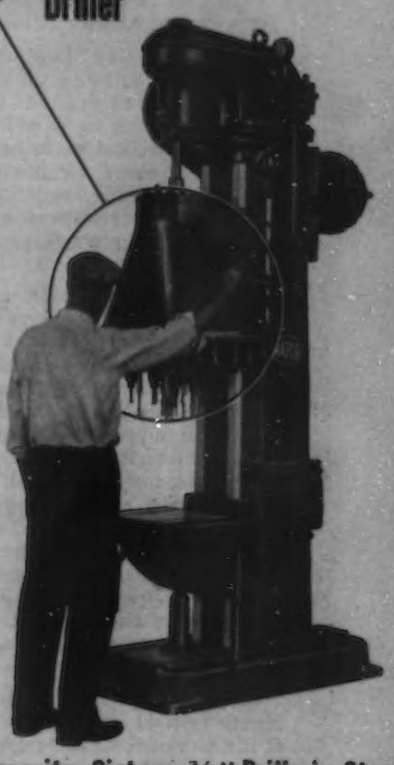
2 Drill Head Driller



Capacity, Sixteen ⅜" Drills in Steel

Equipped with a multi-spindle drill head and a high type solid built in base, this machine may be used on production multiple work. Note the large flat slide which makes possible the mounting of different drill heads as desired.

3 Adjustable Multi-Spindle Driller



Capacity, Sixteen ⅜" Drills in Steel

The NATCO Model B-225H may also be furnished with any one of three different sized adjustable joint driven multi-spindle heads. This machine, when arranged in this manner, can be used on a large variety of work requiring numerous spindle setups.

The NATCO Model B-225H is a medium sized driller arranged with a semi-automatic hydraulic feed. It is just one of the many types and sizes of vertical hydraulic feed drilling, boring and tapping machines which make up the NATCO line. Write for complete information.

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Richmond, Indiana, U.S.A.

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Drilling, Boring and Tapping Machines

lishment of sinking funds to reduce the burden of bonded debt on financial structures, but that sinking funds are subject to penalty taxation under the Revenue Act of 1936. Said the commission:

"Those companies which have weak financial structures and should use their income to improve their property, retire funded debt, and build up a liquid surplus against a day of future trouble will, if they undertake to do so, be subject to a penalty, whereas railroad companies with strong financial structures, and able to finance their requirements through the issue of stock, may distribute all their income and thus escape the surtax."

Never Admits Errors

While the New Deal is being criticized for bringing on the business recession through its unsound economic policies, it is well known that the New Deal never has as yet admitted an error. And when anything goes wrong, as it does so often, there is always a whipping boy at hand on which to lay the blame.

Even now New Dealers are hinting that a leading reason for the business let down is high prices, utterly disregarding onerous New Deal taxes and other Administration antics that most certainly are a big item in prices and rising costs today. Steel is especially jumped on as being too high-priced. Cement and building materials generally also share similar New Deal criticism. Arguments to counteract the criticism, no matter how factual and how strongly supported otherwise, do not make the slightest dent on the critics, among whom are New Deal brain trusters.

But the New Deal finds that while highly critical of others, criticism of it does not come exclusively from business. It has objective critics in its own ranks who find that the New Deal has not made good on its glowing pre-election recovery promises. This is in essence the purport of the official announcement last week of the Bureau of Agricultural Economics, which was assisted by representatives of the following organizations: Agricultural Adjustment Administration, Federal Extension Service, Federal Bureau of Home Economics and State Agricultural Colleges.

This frank, and certainly not unfriendly report, said:

"An analysis of the general situation indicates that in the fall of 1937 the upswing of the business cycle has been temporarily halted. Although it is impossible to determine definitely to what extent the present recession will continue into 1938, the chances appear against a sufficiently early vigorous rise in 1938 to bring the average of industrial activity and of consumer incomes for that year up to that of 1937."

Income to Drop

It went on to predict that the national income for 1938 will be below the high level which prevailed in 1937, "tentatively estimated to be about $69,000,000,000."

This report was especially interesting, too, in that at about the time it was put out the President at Hyde Park, shunting aside inquiries if business would be stimulated by tax revision, indicated the belief that a $90,000,000,000 or even $100,000,000,000 income was envisioned by him for the future. He was talking in rosy terms of a sharp upswing of the national income just as the Bureau of Agricultural Economics in rather dark terms was predicting a downward swing.

But the President left unanswered what, if anything, he wanted done with regard to tax relief. Certainly tax relief will mean more in behalf of the ill-fed, ill-housed and ill-clothed than any amount of political drivel will ever mean.

* * *

Annual canvass of the manufacture and sale of farm equipment and related products for the calendar year 1937 will begin by mail about Jan. 1. It will reveal the number of establishments engaged in manufacturing farm equipment and related products during 1937 and the number of pieces of equipment manufactured and their value. In addition, important sales infor-

JONES & LAMSON MACHINE

mation will be gathered which will show domestic and export sales. The 1936 survey showed 1103 establishments manufacturing products valued at $487,273,428.

* * *

American shipyards on Oct. 1 were building or had under contract to build for private ship owners 145 steel vessels of 312,904 gross tons, according to the Bureau of Marine Inspection and Navigation, Department of Commerce.

* * *

Amounting to only 297 miles or 5 per cent of the total, cast iron pipe played a small part in pipe requirements for the completion of sewer construction and treatment plants under the PWA program. According to an exhaustive PWA analysis of sewer construction expenditures during its four and one-half years' existence this agency required more than 5100 miles of pipe of which 78 per cent was vitrified clay pipe.

* * *

After announcing last Tuesday that hearings on its complaint against the Cement Institute would begin today, the Federal Trade Commission has changed its plans and, at the request of the institute, postponed the hearing to Dec. 1. It will be held in Washington. The complaint charges the Cement Institute and its members with violation of the FTC Act and the Robinson-Patman Act through use of the multiple basing point system in quoting prices.

* * *

The Federal Trade Commission is not going to ask Congress for legislation authorizing the commission to require registration of trade associations, which engage in legislative work. This was indicated by the commission in denying current reports that the FTC was going to seek such legislation.

Scrap Shipments To Japan Slump

WASHINGTON, Nov. 9.—Supporting reports that Japan has been out of the American scrap market for some months is the descending scale of exports of old material to that country since May, the peak 1937 month, with a movement of 443,251 gross tons dropping to 70,437 tons in September.

Exports of scrap to Japan by month in 1937 in gross tons were: January, 36,289; February, 73,635; March, 224,873; April, 283,828; May, 443,251; June, 259,936; July, 210,608; August, 207,185; September, 70,347. The aggregate of 1,806,943 tons of scrap exported to Japan in 1937 nine-month period was 54 per cent of the total of 3,335,194 tons exported during that period.

Figures given out by Secretary of Commerce Daniel Roper show that the reduced volume of exports to both Japan and China in September was due in substantial part to declines in iron and steel shipments to those countries. The value of September exports to China amounted to only $1,559,000 compared with $6,081,000 in August. September exports to Japan dropped to $16,842,000 from $24,644,000 in August.

Exports of scrap to Japan in September were valued at $1,401,878 compared to $4,473,394 in August. Pig iron exports declined to $711,812 from $1,371,475, steel ingots, etc., to $208,394 from $2,870,624 and unfabricated plates to $781,800 from $1,247,798.

A film suitable for technical or semi-technical meetings entitled "Building the World's Largest Precision Instrument," describing the story of fabricating the mounting of the Mt. Palomar 200 in. telescope is available through district offices of Westinghouse Electric & Mfg. Co. The film is 16 mm. silent and 400 ft. in length. It shows details of construction, including arc welding and fabricating, a working model of the finished telescope and the dedication party including many notables.

J&L

WHEN IS A GADGET NOT A GADGET?

THE single lever dial speed selector on the J&L Universal Turret Lathe was designed to give the operator an easier, yet more productive day. Such a radical departure from former designs naturally brought the criticism, "The J&L speed selector is just another gadget." Proof that it is not? —It has given trouble-free service as standard equipment on J&L Turret Lathes for the past three years. Ask any J&L Turret Lathe operator what he thinks! He is the fellow who earns the premium. A gadget is no longer a gadget when it is accepted as a production advantage and an essential to better living and working conditions.

COMPANY, Springfield, Vermont, U. S. A.

Freight Rate Decision Unlikely Soon; Trucking Companies To Ask Increase

WASHINGTON, Nov. 9.—Indications point to prolonged hearings on the railroad petition filed last Friday with the Interstate Commerce Commission for further freight rate increases and advances for passengers traveling in coaches in the Eastern territory. (Railroads operating in the Southern and Western districts recently made certain increases in passenger fares.)

Some sources believe the hearing will be expedited, since the commission has already set Nov. 27 as the date and Washington the place, and formed a new division to hold hearings simultaneously in various cities.

The carriers are asking for a horizontal increase of 15 per cent in freight rates, except in five commodities for which certain maximums are requested. On bituminous coal and coke the railroads are asking for an increase of 15c. per net ton except where in the I.C.C. decision of Oct. 22 the increase was 15c. The maximum will be 10c.

Bituminous coal and iron ore interests are expected to fight the further rate increases and since numerous other shippers are reported to be prepared to protest, the belief is that the hearings will be extensive, despite the railroad suggestion to the I.C.C. for a prompt investigation and speedy determination of the case.

Estimates as to the time the case will require and the extent of relief the I.C.C. may give the financially-pressed railroads are, of course, only speculative. The estimates generally fix six months as the minimum time in which a decision will be handed down. Other "guesses" fix the time at one year, the period required in the recent general freight rate advance.

Significant was the announcement in New York by trucking companies on the eve of the filing of the railroad request that they also plan to ask the I.C.C. and state regulatory bodies for a 15 per cent freight rate increase. Like action now is expected by water carriers.

This concerted move by these three transportation services has been repeatedly recommended by the I.C.C. with a view to stopping the practice of cutting rates below cost to meet motor truck and water carrier competition. It is reported that the three transportation services, responsive to the I.C.C. suggestion, have joined in an increase in the level of competitive rates "which would leave the relative position of all unchanged and at the same time improve the financial condition of all."

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BLANCHARD
The illustration shows a No. 18 Blanchard grinding one surface flat to within .002" on a 19" x 14" x 16" high semi-steel meter body. Stock removed ⅛". Production 6 per hour. This is double the quantity formerly secured by a planing operation. If you have flat surfaces to be machined let us suggest what can be done with a Blanchard. Send sample pieces or blueprints. No obligation.
THE BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASS.

Navy Will Open Tender Bids Dec. 1

WASHINGTON, Nov. 9.—The Navy Department has postponed from Nov. 17 to Dec. 1 the date for opening bids for one 8300-ton seaplane tender and one 9000-ton destroyer tender at request of prospective bidders.

The department said that when bids are received from private builders and estimates are in from the Navy yards, decision will be made as to which vessel will be constructed by contract. The third deficiency act of 1937 authorizing their construction requires one to be built in a Navy yard.

Lincoln Electric Co., Cleveland, has opened a new sales office at Phoenix, Ariz., in charge of R. J. Reardon, who for the past six years has been welding engineer and supervisor of the American Metal Products Co., Detroit. The office will maintain a stock of the company's Shield Arc SAE arc welding machines and a complete stock of Lincoln electrodes.

Ex-Cell-O Counterbores

The outstanding feature of Ex-Cell-O Continental Interchangeable Counterbores is their balanced, indestructible drive. Direct results of this exclusive driving principle are long life, rapid change-over, and consequent low tool cost and operating economy. The drive is by integral formed lugs, both in the holder and on the cutter, with aligning bearings both above and below the drive. This eliminates "run-out" of the cutter.

The ease with which standard cutters are engaged and disengaged is also important; it requires simply rotating a quarter-turn by hand. Both right and left-hand cutters may be driven by the same holders. Ex-Cell-O's advanced cutter design provides for maximum chip clearance.

Ex-Cell-O Counterbores are also furnished with taper drive. Both standard and special holders and cutters can be provided to meet individual requirements. The Ex-Cell-O Counterbore Catalog and prices will be mailed upon request.

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EX-CELL-O CORPORATION • DETROIT, MICHIGAN

Sperry Corp. Faces Complaint By FTC

WASHINGTON, Nov. 9. — Charging violation of Section 7 of the Clayton anti-trust law by acquiring the capital stock of two competing corporations, the Federal Trade Commission today issued a complaint against the Sperry Corp., 30 Rockefeller Plaza, New York, and allowed the respondent company 20 days in which to file answer.

The FTC complaint charged that acquisitions by the Sperry Corp. of the capital stocks of the Waterbury Tool Co., Waterbury, Conn., and Vickers, Inc., Detroit, "may substantially lessen competition between the two subsidiary companies" or "tend to create a monopoly in the Sperry Corp. in the hydraulic pump, transmission and allied products business."

The two companies, according to FTC, are competitors and constitute the sole source of supply of hydraulic transmissions, pumps and allied products for use by the United States Navy. The total volume of business of the two concerns allegedly represents a substantial part of the total business done in the United States in these products, according to the complaint.

The case was based on alleged acquisition of Vickers, Inc., by the Sperry Corp., when the latter acquired, under a reorganization plan approved last April, all issued and outstanding common capital stock of Vickers, Inc., and 4882 shares of outstanding preferred stock. As a result of the reorganization move, FTC charged that Vickers, Inc., is controlled as one of the Sperry Corp.'s subsidiaries.

Other subsidiaries of the corporation were listed as the Sperry Gyroscope Co., Inc., Sperry Gyroscope Co., Ltd., (England), Ford Instrument Co., Inc., and the Intercontinent Corp.

J. & L. Low on Navy Ferromanganese

WASHINGTON, Nov. 9.— Submitting a figure of $125.953 per gross ton, delivered at the Philadelphia Navy Yard, the Jones & Laughlin Steel Corp. was low bidder on 8000 tons of ferromanganese for the Navy Department.

On alternate bids asked on 24,000 tons of 40 per cent manganese ore, the L. J. Buck Corp. was the low bidder at 35.5c. per unit, f. o. b. Philadelphia Navy Yard, or 34.5c. f. o. b. cars, Port Richmond, Pa., duty unpaid on 43 per cent Russian ore. Equivalent bids on the tonnage with duty paid were 46.7c. and 45.7c., respectively, for these deliveries.

Two Bidders on Ore

The Buck corporation submitted a bid of 46.2c., duty paid, f. o. b. ocean steamer alongside dock at the navy yard. The only other bidder on the ore was the Cuban American Manganese Corp., which quoted a price of 59.20c. on 38 per cent ore, two points below the minimum required.

The Jones & Laughlin bid on ferromanganese provided for a 0.5 per cent 10-day discount. Three other bidders, Carnegie-Illinois Steel Corp., the Bethlehem Steel Co., and E. J. Lavino & Co., each submitted a bid of $128.75, with a 0.5 per cent 10-day discount. The Carnegie-Illinois bid was for either 6000 or 7000 tons.

Prices on Present Rate of Duty

The Electro-Metallurgical Sales Corp. submitted a bid of $139 per ton on ferromanganese packed in barrels and $132 per ton on ferromanganese in bulk. All prices were based on the present rate of duty on manganese ore. Jones & Laughlin gave East Coast of Africa and India as the sources of its ore. The Navy Department schedule called for 68-72 per cent ferromanganese.

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Toolmakers know the value of a well stocked crib of Starrett Tools. They count on them heavily to keep those important special tools, jigs and fixtures accurate to split thousandths. And that goes for machine tool operators and inspectors. They all find features in Starrett Tools and Dial Indicators that help them do better work, do it faster and with less chance of error. Revised Catalog No. 25AA describes the complete line of Starrett Precision Tools. Write for it.

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SAVE time and trouble on special tools like this angle parallel or on jig and fixture parts, templates, gauges, etc., by using Starrett Ground Flat Stock. Ask your distributor about it.

THE L. S. STARRETT CO., ATHOL, MASS., U.S.A.

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The most used and abused machine in the average office is the modern typewriter .... the entire business of the firm is transcribed on its busy keys.

That means hundreds of strokes for a page letter or about a million hammer taps on its delicate mechanism every month. Yet it keeps going year after year with amazing stamina.

How can it stand such punishment? . . . It's the stuff it is made of . . . Cold Finished Steel to give extra strength and wear resistance to the vital parts and keep them in permanent alignment for doing a letter-perfect writing job throughout the life of the machine.

Common-sense dictates the use of quality B & L Cold Finished Bar Steels for the working parts of typewriters, comptometers, cash registers, multigraph, dictaphone equipment, and other business machines.

B & L engineers will gladly work with you in determining the proper grades of carbon and alloy steels for your products.

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..PERSONALS..

STEPHEN M. JENKS has been appointed assistant general superintendent of the Gary works of the Carnegie-Illinois Steel Corp. C. P. KIMMEL, has been made assistant to general superintendent; GEORGE H. BAUER, chief engineer; SIGUARD LANDEN, assistant chief engineer; T. R. MILLER, assistant division superintendent, West mills; and WALTER J. KIRTON, plant industrial engineer.

Stephen M. Jenks, the new assistant general superintendent, has been with United States Steel Corp. subsidiaries since July, 1925. He began with the American Sheet & Tin Plate Co., now a part of Carnegie-Illinois, as an engineer. He served in various positions in the company's Pittsburgh and Chicago districts until 1936, when the construction engineering division of Carnegie-Illinois was established at Pittsburgh, and he was made chief engineer. In February of this year Mr. Jenks was appointed chief engineer at Gary works.

C. P. Kimmel has served continuously at Gary works since he began in the roll shop in 1908. He has been assistant general superintendent of Gary works since 1918.

S. M. JENKS

C. P. KIMMEL

G. H. BAUER

PLANING A MACHINE TOOL COLUMN in the Planer Dept., division of Heavy Mfg. Dept. Complete equipment for job work — planers, boring mills, heavy turret lathes, radials, etc.

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LINE OF LATHES in "world's most famous toolroom" (open to you), scene of contributions to development of motors, typewriters, sewing machines, and other world-revolutionizing inventions.

ANOTHER TAFT-PEIRCE TOOLROOM JOB—Boring an aircraft fixture to a tenth with the T-P adjustable boring head.

DONE WITH MIRRORS. Ingenuity in a difficult set-up. Mirror enables operator to see wheel. Arrow points to reflection of tool. Grinding Dept. does all job work, hardened and ground parts.

SETTING COMPOUND ANGLES is simplified by the Taft-Peirce Adjustable Angle Plate—a leading item in the complete T-P line of standardized toolroom specialties.

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Take it to TAFT-PEIRCE for Contract Manufacture, Design, Tooling, Gages, Set-Up and Inspection Tools

George H. Bauer, who succeeds Mr. Jenks as chief engineer, has been at Gary works since 1920. Previously he had spent four years with the Canadian Steel Co. He was made assistant engineer at Gary works in 1929 and assistant chief engineer in 1934.

Siguard Landen, who succeeds Mr. Bauer as assistant chief engineer, began at Gary works as a draftsman in 1924. In 1934 he was made division engineer, the position which he has held until the present time.

Starting as chief operating engineer at Newcastle, Pa., in 1906, T. R. Miller, new assistant division superintendent, West mills, has been with U. S. Steel subsidiaries for 31 years. He was superintendent of power for the Minnesota Steel Co. from 1918 to 1932 and came to Gary works in 1934 as a mechanical designer. He joined the industrial engineering department in 1935, and in January, 1936, was named as plant industrial engineer in charge of the department.

Walter J. Kirton, new plant industrial engineer, has been at Gary works since 1925 when he began as a test engineer.

S. LANDEN

T. R. MILLER

W. J. KIRTON

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KARL F. NYSTROM, general superintendent of the West Milwaukee car shops of the Milwaukee Road since 1927, and connected with the plant since 1922, has been appointed

Most Economical
In Holes Drilled per Dollar
Super Service Uprights are built for those manufacturers who want the best drilling performance obtainable as measured by any practical yardstick. Check against your present equipment and compare and see how much you can save with the convenient single lever control of closely graded speeds and feeds, plus rigidity and power to get the most out of modern cutting tools.
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THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.
Super Service

mechanical assistant to J. T. GILLICK, chief operating officer. He is succeeded by JOSEPH A. DEPPE, connected with the shops since 1902. Mr. Nystrom will continue to have general supervision of the car department and in addition will supervise engineering, designing, construction and coordination of facilities in the mechanical department. All freight and passenger car construction of the Milwaukee Road is concentrated at West Milwaukee.

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WADE H. OLDHAM, formerly manager of the Birmingham district for Republic Steel Corp., has been made district manager of the consolidated Birmingham and Gadsden districts. A graduate of the University of North Carolina, he has been with Republic since 1929. Previous to that he spent five years as general superintendent of the Fairfield steel works, Tennessee Coal, Iron & Railroad Co. He joined the Tennessee company in 1905 as a chemist and in the same year was promoted to the post of blast furnace superintendent, which position he held until 1924.

C. L. BRANSFORD, now assistant district manager, Birmingham, has been named general superintendent of the corporation's Birmingham operations. He, too, is a graduate of the University of North Carolina, specialized in chemical engineering and joined the Tennessee Coal, Iron & Railroad Co. as a chemist. He was later made superintendent of the Alace furnace plant in Birmingham, where he worked under Mr. Oldham. In 1915 he left to go with Gulf States Steel Co. as superintendent of blast furnace department and four years later became superintendent of blast furnaces for the Woodward Iron Co. In 1921 he became identified with the Semet Solvay Co. as fuel engineer and later

W. H. OLDHAM

was made general manager of the company's Ashland, Ky., plant. From there he was transferred to the Buffalo plant as superintendent. In 1929 he returned to Birmingham as superintendent of blast furnaces and coke ovens for the old Republic Iron & Steel Co.

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IRVIN PAUL has been appointed superintendent of the 80-in. hot strip mills and R. G. EBERT superintendent of the 42-in. hot strip mills at the Gary sheet and tin mills of the Carnegie-Illinois Steel Corp. Both men previously served as assistant superintendents of their respective mills.

Mr. Paul first went to the sheet mills as a machinist in 1917 and has served as shop foreman, erection superintendent and turn foreman of the 80-in. mills and in July, 1936, was appointed assistant superintendent. Mr. Ebert was originally employed at the company's American works at Elwood, Ind., as a rougher. After serving as roller, draftsman, master mechanic, and shop foreman at various plants of the same company, he was appointed assistant superintendent of the 42-in. hot strip mills at Gary in July, 1936.

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HARRY W. CROFT has resigned as chairman of the board and as a di-

(Photo courtesy of Novo Engine Co.)

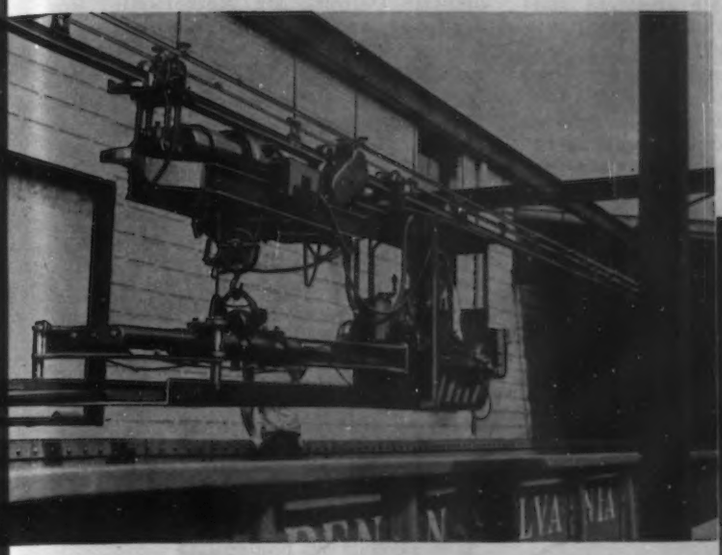
HOIST YOUR PROFITS *with* Better Roller Chains

When the biggest manufacturer of building hoists in the country standardizes on Baldwin-Duckworth Roller Chains—for *all* models—there's some good reason. In this case it was the definite proof that a reliable roller chain drive was lower in ultimate cost, easier to adjust and more compact than any other method of power transmission.

Baldwin-Duckworth Roller Chains are made of the finest alloy steels, carefully heat treated and accurately machined. Let our engineers help you to drives that give quiet efficiency, longer service and a chance to roll up bigger profits. Baldwin-Duckworth Chain Corporation, Springfield, Mass.

BALDWIN DUCKWORTH

CLEVELAND TRAMRAIL MATERIALS HANDLING EQUIPMENT



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WICKLIFFE OHIO

rector of the Harbison-Walker Refractories Co., Pittsburgh. Mr. Croft is succeeded as chairman by J. E. LEWIS, who continues also as president.

RICHARD G. CROFT has been elected a director to succeed his father, who has been closely associated with the company for over 50 years and desired to be relieved of further active duties.

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RALPH R. SCHULTZ, heretofore traffic manager of the White Motor Co., has been appointed traffic manager of Basic Dolomite, Inc., Cleveland.

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A. A. MOTHERWELL, forging expert long connected with the automobile industry, is president and general manager of the newly organized Motherwell Mfg. Co., Pontiac, Mich., a drop forging concern. Mr. Motherwell, originally with the Motherwell Iron & Steel Co. in Lancaster, Ohio, sold his company in 1893 to a subsidiary of the Carnegie Steel Co. and for a time thereafter was employed by Carnegie. He was later identified with the Whitman-Barnes forge shop in Canton, Ohio, and was transferred by that company to Chicago in 1904. He built and installed the plant of the American Spiral Pipe Co. in 1906, after which he returned to the Whitman-Barnes Co. In 1907 he built the Armstrong Brothers forge plant. Starting in 1908 with General Motors Corp., he built the Buick forge plant in Flint. In 1918 he built and installed the Chevrolet forge plant in Detroit. Mr. Motherwell developed and patented dies for forging six-cylinder crankshafts without twisting. In 1926 he retired from General Motors and since that time has been acting in an advisory capacity for several forging plants. A. E. R. SCHNEIDER, of Cleveland, is vice-president of the new company. He has been identified with Lake shipping for many years and was the pioneer in the shipping of automobiles on the decks of bulk freighters west to Duluth, Milwaukee and Chicago. This method helped reduce freight charges on many thousands of cars. EARL LOWE, the secretary-treasurer, is president of Securities Analytical Services, Detroit. The company has leased the Pontiac factory building formerly occupied by the Eaton Axle & Spring Works. Approximately $90,000 will be spent to put the plant in operation.

A. A. MOTHERWELL

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ARTHUR MCCAUGHNA, of Detroit, succeeded Carl W. Bonbright on Nov. 1 as president of the General Foundry & Mfg. Co., Flint, assuming complete charge of all operations. Mr. Bonbright resigned to devote more time to other activities. He will continue as an executive and director of the company. Mr. McCaughna resigned an executive position at the Norge Refrigerator Co. to assume the Flint post.

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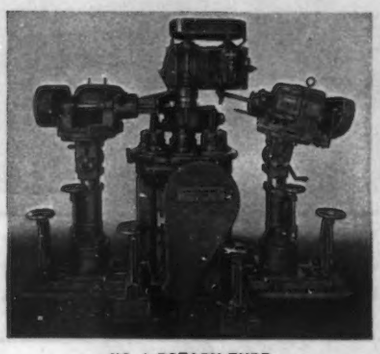
H. J. WALLACE, who has been connected with the National Tube Co., Pittsburgh, for about 10 years, has been made acting manager of sales of the Pittsburgh district, which embraces western Pennsylvania, Ohio, Indiana, eastern Kentucky,



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POLISH BUFF

Automatically

LOWER HOUR COSTS JUMP PRODUCTION

"From 327 to 840 per hour", one of the many statements from manufacturers who are cutting hour costs and jumping production by using PACKERS. Volume Polishing and Buffing must be done automatically to be profitable — PACKERS are Automatic. 3 Types — ROTARY, STRAIGHT LINE CONVEYOR and PORTABLE VERTICAL.

SEND FOR CATALOG ....

A sample of your part, finish and production required will bring you a "Proposal". Try it—there's no obligation.

WRITE ENGINEERING DEPT.

PACKER *Automatic*

POLISHING & BUFFING MACHINES

THE PACKER MACHINE CO., MERIDEN, CONN.

West Virginia and western Maryland. He succeeds the late R. R. Jardine. Mr. Wallace entered the operating department following his graduation from Harvard in 1928 and later was assigned to the metallurgical division. In 1933 he was sent to Indianapolis as a salesman, where he remained until 1935, when he was transferred to Pittsburgh.

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PROF. S. C. HOLLISTER, formerly associate dean of the College of Engineering of Cornell University, has been appointed dean, succeeding the late Herman Diederichs. Before Dean Hollister joined the staff at Cornell on July 1, 1934, he was professor of structural engineering at Purdue University. He received his formal training at Washington State College and the University of Wisconsin.

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DAVID M. HARVEY, for the past six years identified with the Manchester, England, plant of E. F. Houghton & Co., Philadelphia, has been appointed superintendent of the oil department at the Philadelphia plant of the company. He has had more than 20 years of experience as superintendent of production of major oil and chemical manufacturers.

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MILES C. SMITH, who has been in charge of the sales and marketing of Colmonoy products for the past two and one half years, has resigned from Colmonoy, Inc., to direct the sales promotion and sales of Amercoat, a sprayable plastic made by the American Concrete & Steel Pipe Co., Los Angeles.

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CHARLES O. MCINTOSH, has been reelected president of the southern New England chapter of the Institute of Scrap Iron and Steel. Other officers elected include, vice-president, SIDNEY ALBERT, of Waterbury, Conn., and secretary-treasurer, S. SAMUEL KASDEN, of New Haven, Conn.

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S. A. RICHARDSON has been appointed district sales representative in the newly-opened Cleveland office of the Newport Rolling Mill Co., Andrews Steel Co., Globe Iron Roofing & Corrugating Co., Newport, Ky.

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EDWARD F. THEIS, who has been identified with the automotive and home appliance fields for all of his business career, has been made works manager of the home appliance division of Fairbanks-Morse Co., Indianapolis.

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A. T. BROWN, formerly vice-president in charge of the accounting, treasury, traffic and parts departments of the Caterpillar Tractor Co., Peoria, Ill., has been made executive vice-president, succeeding C. PARKER HOLT, who returns to San Leandro, Cal., where as vice-president he will direct and coordinate the work of the several departments. L. B. NEUMILLER, formerly director of industrial relations, has been made vice-president in charge of the parts, service and traffic departments as well as continuing active management of industrial relations. D. G. SHERWIN has been advanced from treasurer to vice-president and will administer the advertising, sales and treasury departments. D. A. ROBINSON, formerly assistant treasurer, has been elected treasurer.

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HARRY SYMANSKY has been elected president of the Capital (Albany) district chapter of the Institute of Scrap Iron and Steel. Other officers elected include: vice-president, HENRY BRADFORD, of the American Iron & Metal Co., Troy, N. Y.; treasurer, S. LEVIN, of Estate of Morris Levin, Albany, and secretary, SAM FINKELSTEIN, of A. Finkelstein & Sons, Hudson, N. Y.

HAND OPERATED

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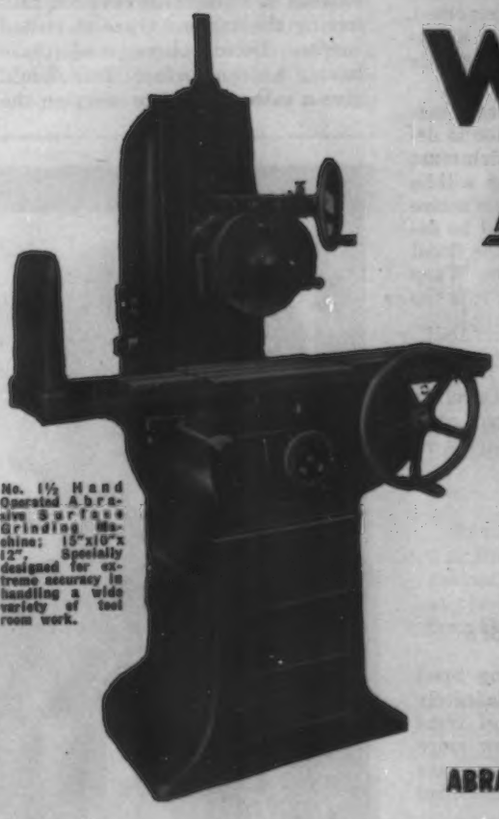
Because



No. 1½ Hand Operated Abrasive Surface Grinding Machine; 15"x16"x12", Specially designed for extreme accuracy in handling a wide variety of tool room work.

So much of the work coming into the average tool room consists of small, one piece, or fussy jobs that they are ground by hand, regardless of the number of feeds or speeds with which the machine may be provided.

Write for particulars

ABRASIVE MACHINE TOOL CO.
EAST PROVIDENCE, R. I.

ABRASIVE

SURFACE GRINDING MACHINES

Navy Reports Strikes, Material Deliveries Delay Ship Program

WASHINGTON, Nov. 9.—Dissatisfaction over progress on the Navy's construction program is indicated in a report filed with the Navy Department by the Chief of Naval Operations, Admiral William D. Leahy. The admiral attributed the delay to strikes, later deliveries of materials and changes during construction.

His annual report described delay taking place in both private and Government yards but made no recommendations for speeding up the program.

Of 53 destroyers under construction, the report said, 23 have been delayed in joining the fleet by "strikes, late delivery of material and necessary changes during construction.

"One heavy cruiser and nine 10,000-ton light cruisers also are under construction," the admiral reported. "Several improvements in armament of the Wichita have delayed its completion date. . . .

"The delivery of the aircraft carrier Yorktown is delayed due to defective reduction gears, which must be replaced before that ship will be ready to join the fleet as an active unit. The Enterprise should be delivered before the end of the fiscal year 1938. The keel of the Wasp was laid April 1, 1936, but it is too early to predict a date of completion on that ship.

"Preliminary plans for the two new battleships, the North Carolina and Washington, have been completed and work will be started on them shortly."

To Make Tests of Rusty Concrete Bars

THE Concrete Reinforcing Steel Institute has decided definitely to proceed with a series of tests which are designed to throw more light on rusted reinforcing bars and their behavior when embedded in concrete.

Since the comprehensive portion of the program will require from 15 to 18 months to complete, a smaller series of tests has been proposed in order to make information available as soon as possible. This test will involve a quantity of ⅝-in. round deformed bars taken directly from the warehouse stock of an institute member, in which the bars selected will present different degrees of surface condition such as:

a. Bars having ordinary mill surface as usually shipped to the job.

b. Bars covered with a coating of firm rust.

c. Bars covered with a coating of firm rust and having a pitted surface.

d. Bars covered with a thin coating of loose scaly rust.

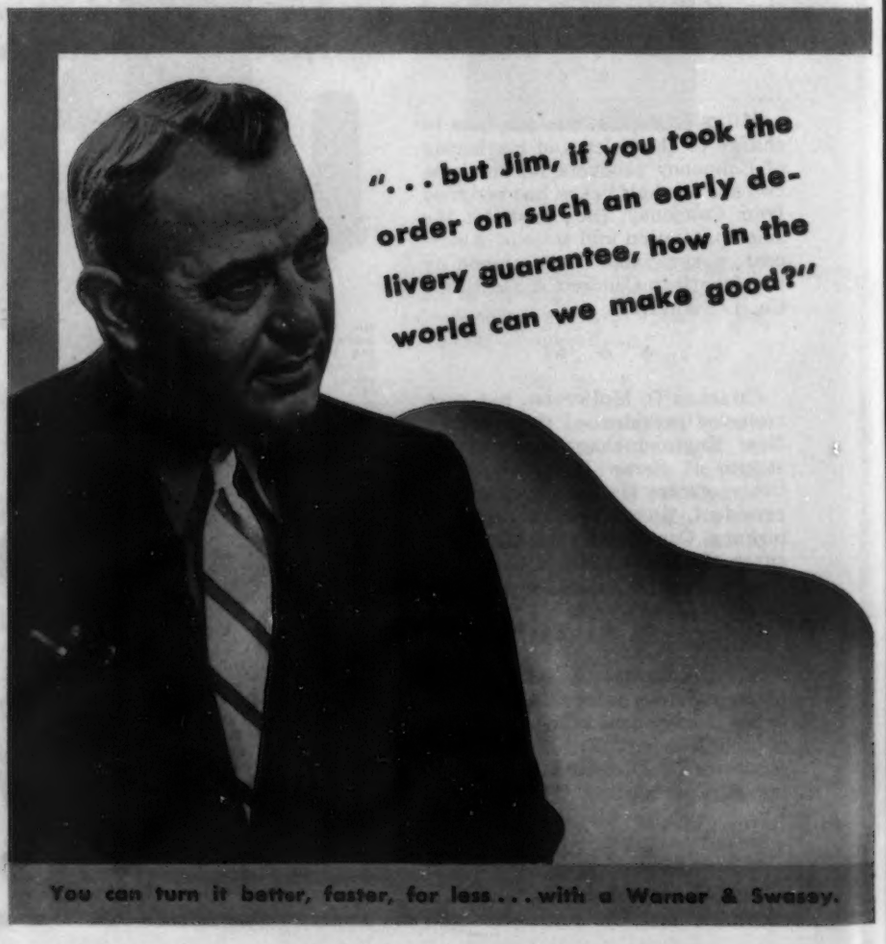
e. Bars covered with a thick coating of loose scaly rust.

Short lengths of bars having these different types of surfaces will be partially embedded in concrete cylinders, leaving one end exposed. The cylinders will then be placed in a testing machine and the force required to produce initial slip of the bar in the concrete will be measured. By this means there will be obtained the comparison of bond value between bars having the various types of rusted surface listed above, and those having a clean surface. This should give a rather complete story on the behavior of bars having varying degrees of rusted surfaces.

To Use Extreme Care

The institute intends to present the data with extreme care in order that there may be no misunderstanding of the results obtained. A close-up photograph of the surface of the bar for each of the different types of surfaces included in the program will be shown, accompanied by a clear and concise description of the surface immediately below the photograph. Following the photograph and description for each type of rusted surface there will be tabulated the bond test results for the bars in that group and the comparison with bars having a clean surface. By this procedure the institute anticipates that it will be able to provide a ready means whereby the engineer or his inspector, by comparing the surface characteristics of the bars under inspection with the photographs and description in the guide, can predict their behavior in the concrete from the tabulated values of the test results.

The few tests that have been made heretofore on rusted bars show that a normal coating of rust


"... but Jim, if you took the order on such an early delivery guarantee, how in the world can we make good?"
You can turn it better, faster, for less ... with a Warner & Swasey.

actually improves their performance in concrete rather than otherwise. This fact, however, has never been given sufficient publicity to offset the lack of knowledge which generally prevails on the subject, according to the institute, so the proposed presentation should prove a valuable contribution and aid in bringing to the attention of specifiers the factual evidence and at the same time should offer a measure of protection to suppliers of of bars against unreasonable requirements in connection with rust on reinforcing bars.

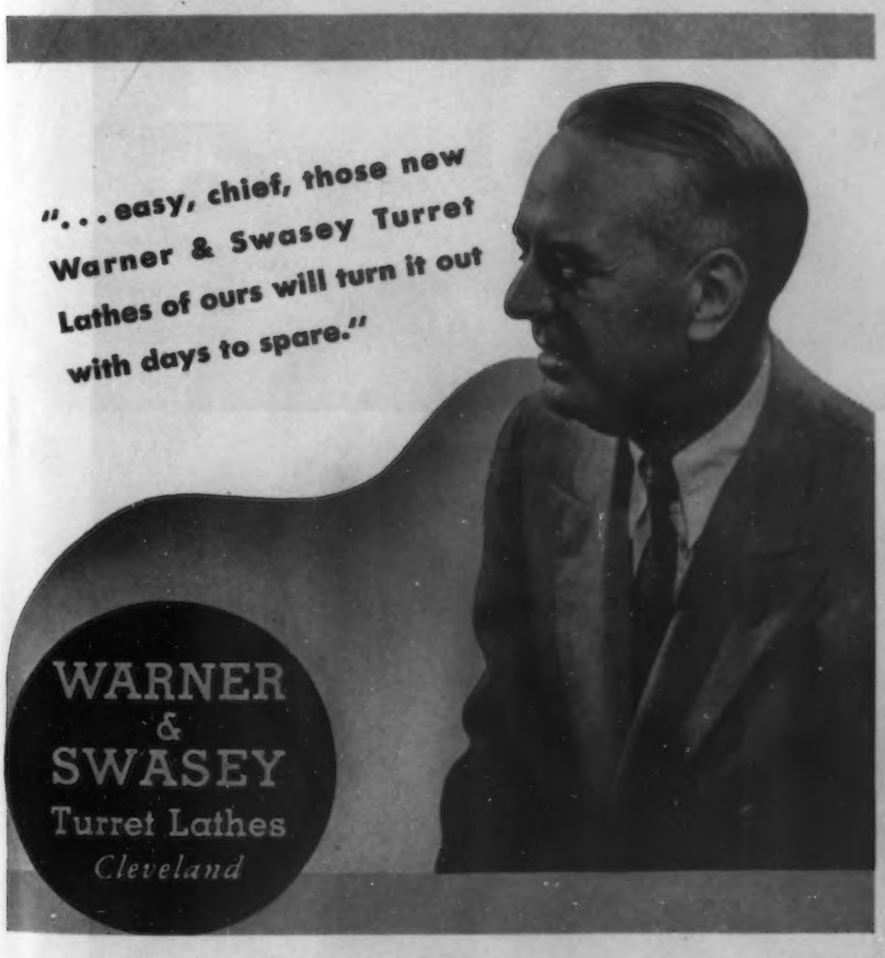
"Mines Register" 1937 Edition

THE 1937 issue of the "Mines Register" is just off the press. This book is the successor to the "Mines Handbook" which last appeared in 1931. In the seven intervening years, numerous changes have taken place among the metal mining companies in the United States, Canada, Mexico and South America. It was a tremendous task to trace all these changes and to bring the report on each company up to date. As a result the 1937 edition of "Mines Register" is a complete revision of the "Mines Handbook," in a more compact and convenient form. It not only contains descriptions of more than 4,000 active mining companies but also refers to more than 15,000 inactive ones.

In the new edition, the mining companies are listed alphabetically and the description of subsidiary and affiliated companies follow those of the parent company. The report on each mining company, besides containing a detailed history of the company, its predecessors and affiliates, also gives the financial structure of the company, a description of its mining properties, their geology, production and costs, type of equipment used, the officers and directors of the company, the names of the mining engineers, managers and purchasing agents.

Many new features have been included in this edition and among them are: a description of some of the leading non-ferrous metal mining companies in various parts of the world; an enlarged statistical section on non-ferrous metals; a special alphabetically arranged list of officers and directors and the companies with which they are affiliated; an alphabetically arranged list of consulting and mining engineers, superintendents and purchasing agents and the companies with which they are affiliated; a special section devoted to security prices of mining companies that are listed on the important exchanges in the United States and Canada, giving the highs and lows for the years 1929 through June 1937; an extensive buyers guide index of various mining machinery, equipment and supplies. The glossary of mining terms and the section devoted to the mineralogy of minerals have been completely revised and expanded.

The book is published by Atlas Publishing Co., Inc., and sells for $25.


"...easy, chief, those new Warner & Swasey Turret Lathes of ours will turn it out with days to spare."
WARNER & SWASEY
Turret Lathes
Cleveland

...OBITUARY...

HOWARD C. MYERS, engineer of tests of the Midvale Co., Philadelphia, died on Nov. 2 from a heart attack.

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C. M. BURNETT, vice-president and one of the founders of the Lewis Bolt & Nut Co., Minneapolis, died in that city on Oct. 31, aged 54 years. He had been a resident of St. Paul since 1919, when he became sales manager of Paper Calmenson & Co. He was formerly identified with the Bethlehem Steel Co., Bethlehem, Pa.

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FRANK V. KUHN was buried Nov. 6 at Detroit. Mr. Kuhn who was in charge of estimating and time study at the Detroit Lubricator Co., was born Sept. 10, 1899, in Cincinnati.

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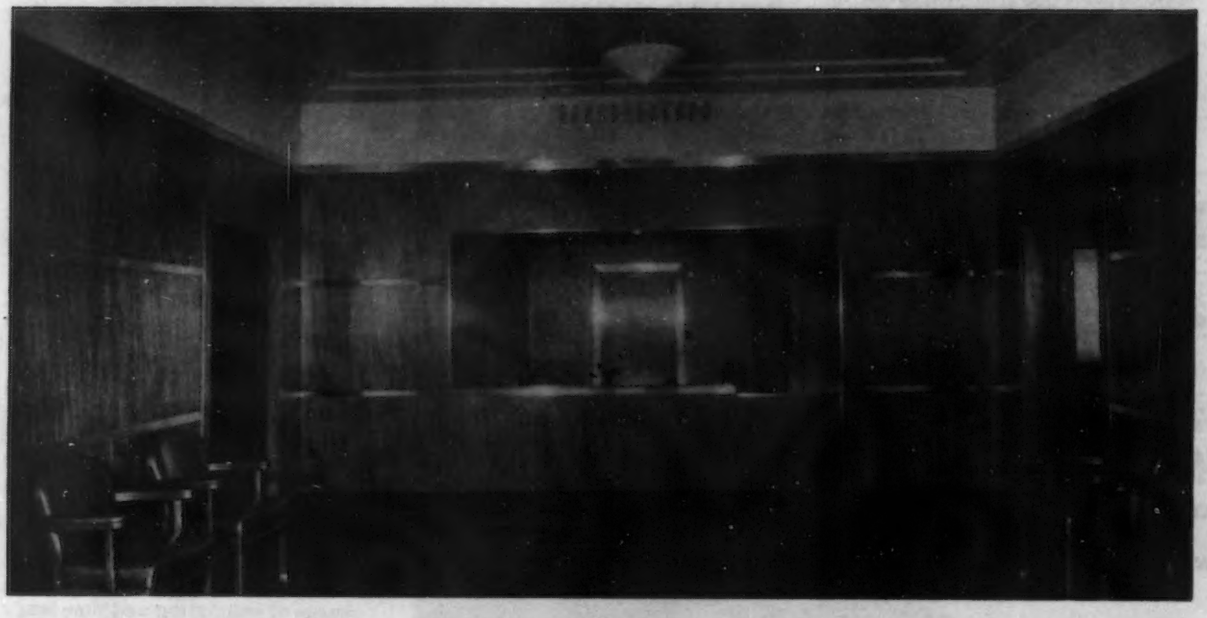
ARTHUR JOHN RAMSEY, vice-president of Pittsburgh Rolls Corp., a division of the Blaw-Knox Co., died Oct. 31 at his home in Pittsburgh. Mr. Ramsey's first employment was with the American Steel & Wire Co. at Cleveland, where he learned his trade as a roll turner. He next went with the Illinois Steel Co. at Joliet, Ill., where he worked for 10 years, followed by a six-year tenure with Bethlehem Steel Co. at Bethlehem, Pa. In 1913, he joined the Pittsburgh Rolls Corp., and its predecessor company as roll shop superintendent, becoming vice-president in charge of sales in 1930.

Armco Dedicates New Research Laboratories

"AN insurance policy for future progress" is the way in which the new Research laboratory of Armco, at Middletown, Ohio, was characterized by a distinguished scientist and research engineer who paid tribute to this accomplishment.

If men are influenced by environment and most of us believe that they are, splendid results should be obtained in this new home of research in which nothing is lacking for the translation of ideas into realities.



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PASSING through the main entrance, one finds himself in this attractive reception room.

NOTE the well lighted corridors, which lead from one laboratory to another.

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MORE than 200 distinguished scientists from all parts of the country attended the dedication of Armco's new research laboratories at Middletown, Ohio, on Nov. 5 as guests of the American Rolling Mill Co. The new research building is a colorful and impressive structure which departs from traditional design and which incorporates the modern concept of porcelain enameled iron, stainless steel and glass block. It was built by the Austin Co. of Cleveland at a cost of $280,000.

Inspection of the new laboratories during the afternoon was followed by a dinner at the Hotel Manchester, Middletown, Ohio, at which Dr. Anson Hayes, head of Armco Research, was chairman. Addresses were made by George M. Verity and Charles R. Hook, chairman and president respectively of the American Rolling Mill Co., and by Charles F. Kettering, vice-president and director of research of General Motors.

Mr. Verity reviewed the history of research at Armco during its development from an initial capacity of 900 tons per month of finished sheets to its present capacity of 177,000 tons per month. He emphasized the fact that during all of this period the search for better quality of existing products and for new quality products, which is the fundamental objective of research, had been a cardinal principle of the management.

o o o

PHYSICAL laboratories are equipped to the last word, even to a miniature rolling mill for cold rolling experiments.

o o o

MICROSCOPIC examinations of all sorts are made by eye and by camera.

Research at first, said Mr. Verity, was of necessity carried out in the plant in conjunction with production, but it soon became apparent that it should be segregated. The first effort in this direction was represented by the taking over of a small frame building which had been formerly used as a superintendent's office and which was but 18 ft. by 30 ft. in size. This was followed, after ten years, by the construction of a two and one-half story brick research building, then considered the last word.

When this building was destroyed by an explosion in 1935, the management decided to make a fundamental study of its research problems and to build accordingly. The result is the present research building in which everything available in the way of equipment and facilities known to the state of the art, in each factor involved, has been provided.

Research, as applied to present-day industry, is defined by Mr. Verity as being: "The intelligent direction and practical application of the factors which make for that sort of change which is the inseparable companion of life and progress."

Research Has Its Human Aspects says Charles R. Hook

Charles R. Hook, president of the American Rolling Mills Co., called attention to the human side of research as reflected in the production of more and better goods and products for people. The real goal of industry, said Mr. Hook, is to find new products for old uses, new uses for existing products and new products for new uses. Through this process, said Mr. Hook, as industry itself grows, more people will have jobs and more money with which to

CHEMICAL equipment enables the research engineer to explore the unknown and the unseen.

buy these new conveniences. Research is the key to this door, and industry is the force which can turn the key in the lock.

Charles R. Kettering, the guest speaker at the dinner, treated the subject of "Research, Industry and Progress." Speaking extemporaneously, as is his custom, "Ket," as he is known to his friends throughout industry, kept his audience spellbound as he castigated the defeatist philosophy of "it can't be done" and showed how research, by the progressive obsolescing of present-day attainments, opens the door for future progress which he believes to be unlimited and endless.

Some Details of the Building

The building has a frontage of 255 ft. and a depth of 175 ft., providing 43,500 sq. ft. of floor space. It is a sawtooth type with welded steel frame construction of new design. Structural steel framework and bent beams for the sawtooth roof were largely pre-welded.

Seven sawtooth faces extend over the width of the laboratory section of the building. Each sawtooth section has an area of 10 glass panels, with an area 10 ft. 4 in. by 15 ft. The glass block, 5 in. by 8 in. and 4 in. thick, is supported in channels of the structural beams, with ¾-in. rod X-type wind bracings. Steelox metal roof panels are 18-gage galvanized iron, with a 5-in. web on 9-in. centers, spanning 15 ft. from girder to girder.

Ceiling of the chemical section is solid metal, with no perforations. The solid panels prevent gases from collecting under the roof of the building. Exterior walls rest on a concrete floor slab which is integral with the building foundation. Three of the exterior elevations are faced with combinations of porcelain enameled iron sheets, stainless steel and glass block. They are formed with 13.6 lb. 4-in. square metal tubing, which provides the skeleton for outside walls. Steelox channel sections, manufactured by Steel Buildings, Inc., an Armco subsidiary, form the nucleus of the wall sections.

Ventilation and atmospheric conditions are controlled by two air-conditioning systems, one for the research staff offices and one for the testing shops and laboratories, which provide zone control for northern and western exposures. The laboratory section is conditioned by three units, each providing zone control in a self-contained group of rooms. These are supplemented by fume and heat exhaust systems in chemical laboratories.

There are twelve laboratories with complete facilities for specialized research. They include equipment for setting up tests to determine and maintain the quality of all Armco products; welding methods with flat-rolled materials; forged steel car wheels; stainless steel; development of corrosion-resistant sheets and strip; iron sheets for porcelain enameling; high-finished sheets for deep drawing; sheets for electrical uses; development of zinc and other metal coatings for sheets; development of non-metallic coatings and the improvement of surfaces to hold these coatings; also for blast furnace, open hearth and electric furnace experiments.

INTERESTING research on vacuum fusion is carried out with this apparatus.

Imports (In Gross Tons)	September		Nine Months Ended September	
	1937	1936	1937	1936
Pig iron	7,911	15,080	84,038	137,607
Sponge iron	230	29	2,410	1,409
Ferromanganese[1]	1,898	2,778	22,560	18,123
Spiegeleisen	3,000	4,173	16,894	30,807
Ferrochrome[2]	....	....	240	21
Ferrosilicon[3]	504	1	2,384	447
Other ferroalloys[4]	....	100	52	526
Scrap	8,566	8,932	70,257	97,139
Pig iron, ferroalloy and scrap	*22,109*	*31,093*	*198,835*	*286,079*
Steel ingots, blooms, etc.	....	10	124	79
Billets, whether solid or hollow	101	82	1,486	615
Wire rods	1,658	1,607	12,497	14,379
Semi-finished steel	*1,759*	*1,699*	*14,107*	*15,073*
Concrete reinforcement bars	149	178	3,752	3,263
Hollow steel bars	105	263	1,864	1,598
Merchant steel bars	1,714	4,237	37,990	28,889
Iron slabs	....	....	1	....
Iron bars	286	135	1,627	1,007
Boiler and other plate	....	174	204	376
Sheets, skelp, and saw plate	18	3,119	8,343	17,037
Die blocks or blanks, etc.	2	3	93	158
Tin plate	29	5	191	145
Structural shapes	2,537	5,211	64,552	41,135
Sheet piling	....	46	2,161	2,197
Rails and track material	1,134	1,290	7,673	6,237
Welded pipe	357	994	7,464	4,749
Other pipe	1,573	5,504	27,563	19,485
Cotton ties	....	163	454	1,629
Other hoops and bands	932	2,156	21,927	17,755
Barbed wire	1,624	733	12,262	11,939
Round iron and steel wire	345	449	3,823	3,779
Telegraph and telephone wire	....	1	16	36
Flat wire and steel strips	371	232	3,814	2,165
Wire rope and strand	320	182	2,818	1,802
Other wire	146	346	2,986	1,353
Nails, tacks and staples	321	1,440	13,037	17,720
Bolts, nuts, and rivets	10	27	477	413
Horse and mule shoes	64	41	341	300
Rolled and finished steel	*12,037*	*26,919*	*224,433*	*185,167*
Malleable iron pipe fittings	117	37	404	121
Cast iron pipe and fittings	658	79	2,616	377
Castings and forgings	391	166	3,691	949
Total	37,071	59,993	444,086	487,766

[1] Manganese content. [2] Chrome content. [3] Silicon content. [4] Alloy content.

Exports (In Gross Tons)	September		Nine Months Ended September	
	1937	1936	1937	1936
Pig iron	64,945	321	653,369	1,690
Ferromanganese and spiegeleisen	1	16	1,626	334
Other ferroalloys	655	141	2,103	1,957
Scrap, iron and steel	252,713	152,312	3,281,508	1,585,155
Scrap, tin plate	2,882	1,589	25,472	11,773
Waste-waste tin plate	596	3,224	28,214	28,761
Pig iron, ferroalloys and scrap	*321,792*	*157,603*	*3,992,292*	*1,629,670*
Ingots, blooms, billets, sheet bars	18,909	1,097	192,251	13,498
Ingots, etc., alloy steel incl. stainless	1,778	....	6,776	....
Skelp	11,830	5,781	69,997	33,282
Wire rods	7,571	1,541	43,568	27,137
Semi-finished steel	*40,088*	*8,419*	*312,592*	*73,917*
Bars, plain and reinforcing	11,635	4,240	102,158	39,148
Bars, alloy steel	546	....	4,866	....
Bars, stainless steel	9	....	180	....
Iron bars	138	63	1,956	851
Plates, plain and fabricated	44,369	5,493	288,915	51,536
Plates, alloy steel	55	....	2,390	....
Plates, stainless	111	....	139	....
Sheets, galvanized steel	6,794	4,211	55,062	40,484
Sheets, galvanized iron	400	151	3,970	1,212
Sheets, black, plain steel	27,069	10,199	205,901	99,189
Sheets, alloy steel	992	....	4,543	....
Sheets, stainless	124	....	1,005	....
Sheets, black iron	1,372	431	8,481	5,600
Hoops, bands, strips, plain steel	10,707	4,942	86,384	45,285
Hoops, bands, strip steel, alloy	53	....	967	....
Hoops, bands, strip steel, stainless	51	....	444	....
Tin plate and taggers' tin	20,815	8,893	234,082	171,250
Terne plate (including long terne)	404	50	4,092	2,528
Structural shapes, plain material	10,585	5,973	109,304	42,416
Structural material, fabricated	3,232	1,598	27,317	12,952
Sheet piling	296	204	3,771	1,949
Tanks, steel	3,534	1,155	24,444	17,145
Steel rails	9,704	2,374	78,691	53,764
Rail fastenings, switches, spikes, etc.	895	887	12,688	9,447
Boiler tubes	950	499	9,862	4,951
Casing and oil line pipe	5,509	2,523	68,657	18,580
Pipe, black and galv., welded steel	3,165	1,242	32,005	14,401
Pipe, black and galv., welded iron	351	278	5,321	2,825
Plain and galvanized wire	3,091	3,935	45,204	33,529
Barbed wire and woven wire products	2,643	3,856	31,510	26,443
Wire rope and other products	1,623	632	13,280	6,022
Nails and tacks	1,366	898	17,621	8,292
Bolts, nuts, rivets and washers except track	1,065	639	8,705	4,719
Other finished steel	249	164	2,236	1,566
Rolled and finished steel	*173,902*	*65,530*	*1,496,151*	*716,084*
Cast iron pipe and fittings	3,088	941	25,250	14,002
Malleable iron screwed fittings	284	364	3,761	2,516
Carwheels and axles	1,673	1,080	12,607	5,947
Castings, iron and steel	608	871	9,794	7,838
Castings, alloy steel, incl. stainless	125	....	1,236	....
Forgings, plain	1,126	243	6,905	2,961
Forgings, alloy steel, incl. stainless	54	....	676	....
Castings and forgings	*6,958*	*3,499*	*60,229*	*33,264*
Total	542,740	235,051	5,861,264	2,452,935

Iron and Steel Imports Lowest Since March, 1935

SEPTEMBER iron and steel imports (other than scrap) into the United States were lower in volume than in any other previous month since March, 1935, according to a preliminary report released by the Metals and Minerals Division, Bureau of Foreign and Domestic Commerce.

Receipts amounted to only 28,505 gross tons, valued at $1,908,645, in comparison with an August trade of 38,379 tons, valued at $2,543,241—declines of 25.7 per cent in quantity and 25 per cent in value. Against the September, 1936, totals of 51,061 tons and $2,208,830, there were declines of 44.1 per cent and 13.6 per cent, respectively.

Pig iron in September resumed its leading position as the principal import item on a tonnage basis, its total of 7911 tons comparing with

(CONTINUED ON PAGE 98)

September Imports of Iron and Manganese Ores

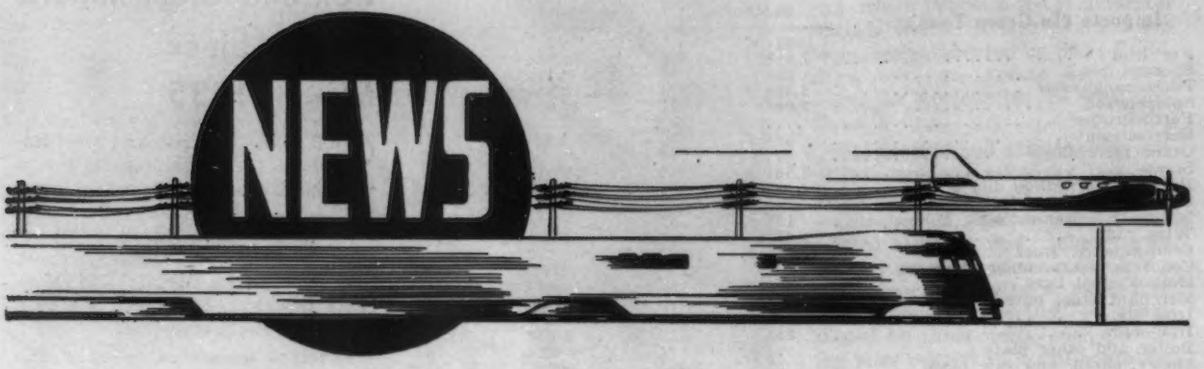
(In Gross Tons)

	Iron Ore		Manganese Concentrates, 35 Per Cent or Over	
	1937	1936	1937	1936
Canada	2,245	31,724	....	....
Cuba	27,000	55,500	....	....
Chile	131,600	131,650	....	....
Spain	....	....	....	....
Norway	6,713	....	....	....
Sweden	17,037	20,573	....	....
French Africa	....	....	....	....
Russia	....	....	....	9,277
India	....	....	4,151	5,608
Brazil	....	....	3,286	973
Gold Coast	....	....	4,162	17,378
Other countries	3,004	18,643	8,463	1
Total	187,599	258,090	20,162	33,237

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	September		Nine Months Ended September	
	1937	1936	1937	1936
United Kingdom	....	220	100	5,066
British India	5,740	5,678	50,860	44,798
Germany	....	250	510	4,129
Netherlands	1,506	4,053	21,150	51,910
Canada	465	201	5,362	9,593
France	....	....	....	....
Belgium	....	....	....	973
Norway	200	1	875	2,073
Sweden	....	55	600	429
Russia	....	4,585	4,581	18,190
All others	....	37	....	446
Total	7,911	15,080	84,038	137,607



Poll Shows SWOC Loses Votes in Strike Centers, Wins Elsewhere

JOHN L. LEWIS' steel union has just succeeded in electing its political candidates in many steel towns where employers have signed Steel Workers Organizing Committee contracts.

At the same time the Lewis union was badly defeated in some other steel centers where the larger employers have not signed contracts and where plants were affected by last spring's strikes.

A complete survey of steel town election returns by THE IRON AGE indicated that the SWOC elected or helped elect 11 mayors and burgesses and some 30 councilmen, school directors and other officials, mostly in western Pennsylvania cities.

No elections were held this month in Illinois and Indiana, where the SWOC plans to have candidates for city and county posts in primaries next May, but Ohio voters defeated SWOC-indorsed candidates in Cleveland, Massillon and Canton. The SWOC fought Mayor Harold H. Burton, Cleveland, for providing police to protect Republic Steel Corp. workers, but Burton was reelected.

Likewise Mayor James Seccombe, Canton, was reelected by a two-to-one vote against bitter opposition of the SWOC. Richard W. Johns, supported by the Independent Labor Union of Republic Employees, defeated William Limbach, the SWOC candidate, for mayor of Massillon.

In nearby Akron, Mayor Lee D. Schroy defeated his SWOC-indorsed opponent, G. L. Patterson, by 10,000.

Where SWOC Won

In addition to aiding the election of Mayor C. D. Scully, of Pittsburgh, the SWOC lifted its candidates to office in the following Pennsylvania cities and towns:

Ambridge, burgess and one councilman; Arnold, burgess, two councilmen and one school director; Brackenridge, burgess and two councilmen; Clairton, mayor; Donora, burgess; Duquesne, mayor; East Pittsburgh, one councilman; Farrell, one councilman and one school director; Glassport, three councilmen and one school director; Midland, one councilman; Monessen, mayor; New Kensington, burgess, one councilman, one school director; Port Vue, one councilman, justice of the peace, school director, auditor; Rankin, burgess, two councilmen, auditor; Versailles, burgess and two council-

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HALF THE COST OF MANUFACTURING MAY BE *Wasted*

• • • • IN *Load Transportation*

Here is a perfect example of well-planned, cost-saving transportation of heavy loads at high speed, in which the Elwell-Parker System reduces the cost of materials handling to the minimum.

Half the cost of manufacturing not only may be wasted but sometimes actually *is* wasted through failure to plan suitable load-transportation methods under changing conditions, but The Ohio Crankshaft Company has proven that economy and speed move together—with resulting profit.

The Company keeps its materials—crankshafts on skids, load weight 2½ tons—steadily on the move, without either keeping machines waiting for parts or piling up and blockading aisles.

You, too, can keep transportation costs so low that a year's savings over previous methods will usually pay for the Elwell-Parkers.

An Elwell-Parker Engineer will show you how. The Elwell-Parker Electric Company, 4225 St. Clair Avenue, Cleveland, Ohio.

New Type ELWELL·PARKER *Trucks*

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

men, and North Braddock, burgess.

Other Pennsylvania industrial towns in which the SWOC elected its candidates are Sharpsville, councilman, and Jeanette, mayor. The SWOC elected a township commissioner in Stowe Township, near McKees Rocks, and two township trustees, a township clerk, and two constables in Brookfield Township, near Sharon.

Regal Engine Buys Esco Co.

REGAL ENGINE CO., Coldwater, Mich., has purchased the Esco Engineering Service Co., Toledo, Ohio, as part of a general expansion program. Name of the Regal company is to be changed to Regal Mfg. Co. and the Esco unit will retain its identity as a Regal Mfg. division, with sales and engineering offices at 1010 Beaubien Street, Detroit.

F. J. McGarry, founder of the Esco company, will be in charge of sales and engineering at Detroit. Frederick M. Ross, well-known engineer, will have general charge of the Detroit office and will act in an advisory capacity at the Coldwater plant where all the Regal company's manufacturing will be done.

Versatile

WELLS
Metal Cutting
BAND SAWS

Versatility in metal cutting reduces equipment and labor cost to a minimum. WELLS BAND SAWS cut most any metal to practically any shape faster and more economically. They eliminate the necessity of additional equipment for varying metal cutting operations. Accurate, a closer tolerance can be kept on a Wells saw—cutting machining time to a fraction. Write for bulletin on the saw of 1001 plant uses.

No. 8 Size
8" diameter round or 8" x 16" flat

No. 5 Size
5" diameter round or 5" x 10" flat

WELLS MFG. CORP. Three Rivers, Michigan

Tool Engineers Form N.Y.-N.J. Chapter

STARTING with a membership of approximately 50, the 14th chapter of the American Society of Tool Engineers was chartered at Newark, N. J., at a meeting held on Nov. 1. The membership includes production engineers in northern New Jersey, New York, Brooklyn and Queens. After listening to the presentation made by Ford R. Lamb, executive secretary of the society, Detroit, 40 of those attending the meeting at the Essex House signed applications and these together with members at large formed the nucleus of the chapter.

C. F. Sheeley, supervisor of tool design, Hyatt Bearings division of General Motors Corp., Harrison, N. J., was elected chairman; Herbert D. Hall, sales engineer, Vandyck Churchill Co., New York, vice-chairman; B. C. Brosheer, associate editor, *American Machinist*, New York, secretary, and R. Rege, manager, production engineering department, Wright Aeronautical Corp., Paterson, N. J., treasurer. B. A. Page, of the Bullard Co., brought greetings from the Bridgeport chapter and N. H. Lou, of the Glenn L. Martin Co., represented the 13th chapter at Baltimore. Conrad O. Hersam, consulting engineer, told of the activities of a group forming a chapter in Philadelphia.

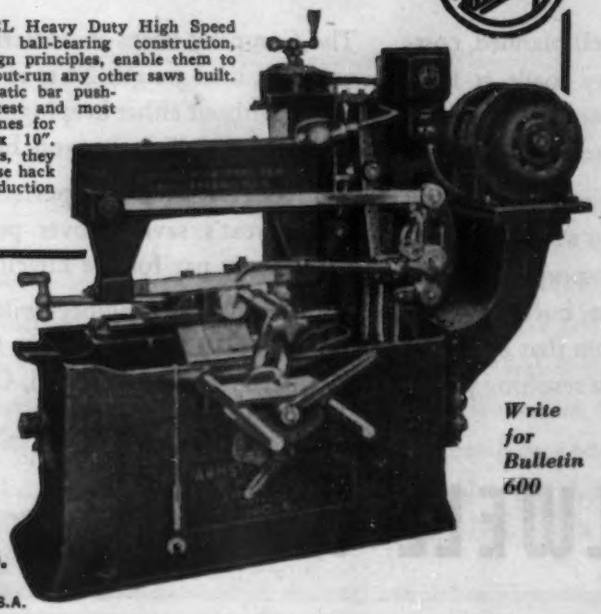
Aside from Mr. Lamb, the national organization was represented by Frank R. Crone, of the Lincoln Motor division of the Ford Motor Co., treasurer of the society. Frank J. Oliver, associate editor, THE IRON AGE, presided at the meeting as temporary chairman. Messrs. Hall, Brosheer and Oliver were members of the local organizing committee, which also included John Cetrule of the Triplex Machine Tool Corp., New York.

SPEED, WEIGHT and STAMINA

MARVEL

Mark these new MARVEL Heavy Duty High Speed Sawing machines. All ball-bearing construction, coupled with advance design principles, enable them to far out-cut, out-last, and out-run any other saws built.

With or without automatic bar push-up, they are today's fastest and most efficient cutting off machines for bar stock up to 10" x 10". Strictly multi-purpose tools, they will serve as general purpose hack saws and/or automatic production machines.



MARVEL No. 6
capacity 6" x 6".

MARVEL No. 9
capacity 10" x 10".

MARVEL No. 6A
with Automatic Bar Push-Up
capacity 6" x 6".

MARVEL No. 9A
with Automatic Bar Push-Up
capacity 10" x 10".

Write for Bulletin 600

Armstrong-Blum Mfg. Co.
"The Hack Saw People"
5749 Bloomingdale Ave., Chicago, U.S.A.

Diesel Transportation Progress Pictured by General Motors

PREDICTIONS that diesel engines eventually will "produce power for very much less than anybody today thinks it can be done," were made by Charles F. Kettering, vice-president in charge of research of General Motors Corp., at a luncheon in New York on Oct. 28.

Possibilities of the diesel engine are unlimited and just beginning to be realized, he said. The luncheon was given by Alfred P. Sloan, Jr., chairman of General Motors, to leading figures in the fields of transportation, steel and finance, and commemorated the 40th anniversary of the first successful oil-burning diesel engine by the late Rudolph Diesel. Among the guests were more than a score of presidents of the nation's Class 1 railroads.

Ralph Budd, president of the Burlington Lines, told the luncheon that adoption by American railroads of modern diesel locomotives, which average twice the service that can be expected of steam locomotives, and at a tremendous saving in operating costs, should "prepare us for almost anything" in railroad transportation, and that whatever developments occur, the public will be the beneficiary.

Guests were told by H. L. Hamilton, president of the Electro-Motive Corp., LaGrange, Ill., subsidiary of General Motors, that General Motors has built a majority of the more than 200 diesel locomotives now in use on American railroads, and that General Motors-built diesels today average 19,420 miles daily, or more than 7,000,000 miles yearly, in mainline high-speed passenger service.

Diesels for Autos Ahead

"I have been asked," said Mr. Kettering, "when we are going to put diesels in automobiles. Well, when we get them good enough. If we keep on making progress the way we have in the last four or five years, some day that might happen. For commercial vehicles, yes—they have a big field and will come very rapidly.

"What of the future of this type of power development? I haven't the slightest idea. We have been making enormous numbers of automobiles for years. We have built up to the present time about 40 millions of automobile engines and we are still improving them every year. In terms of horsepower we are just starting on the diesel engine. Last year we made 250 millions of horsepower in automobile engines and I think we made about two millions of horsepower of diesel engines.

"So, we are making 1 per cent of the horsepower today of diesels that we have in gasoline. That leaves the whole future ahead. You can look ahead with a great deal of interest to the future development of this type of power.

"We have measured our progress in industrial civilization by the horsepower per human being. Now we have a chance of getting more horsepower at a lower cost than we have ever had before in many places. How far it will go, I do not know. If we could make diesels

ARMSTRONG

Equip Your Machine Tools with **ARMSTRONG** *Chrome-Vanadium Wrenches*

STANDARDIZE on lighter, thinner, stronger wrenches for machine wrenches, for automatic screw machines and other light, fast equipment with narrow set nuts and thin headed set screws. Their thinner heads assure a firm grip (without overhang). Their greater strength and longer handles permit a tighter set, give increased leverage. Their bright finish (chrome plate) makes them stand out—saves minutes lost in "fumbling" for the right tool.

STANDARDIZE on these lighter handier wrenches in the assembly department. They speed up work and reduce fatigue. There are types, sizes and matched sets for every need.

Write for Catalog and Prices

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309 N. Francisco Ave.
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MURCHEY
TYPE "G"
Self-Opening
DIE HEAD
Sizes 7/16" to 6" . . .

★ This die head is the pull-off type for stationary spindles. It opens positively and instantaneously and is reset by means of the handle.

Set-up time is reduced to a minimum by ample adjustments for thread diameters and by chaser removal which may be effected without taking off the cap.

In this die head all parts are hardened and ground.

For economy the chasers are interchangeable with the Murchey "C-O" rotating die head. This type "G" die head is rendering excellent service in shops where production is vital.

MURCHEY
MACHINE & TOOL CO.
951 Porter Street • Detroit, Michigan
Collapsible Taps, Self-Opening Die Heads; Bolt Threading, Pipe Threading, and Pipe Cutting Off Machinery.

Alfred P. Sloan, Jr., chairman of General Motors who acted as host at luncheon in New York on Oct. 28 commemorating the 40th anniversary of the first oil-burning diesel and its evolution into the diesel locomotive. Left to right—Charles F. Kettering, vice-president of General Motors; Mr. Sloan; Ralph Budd, president, Chicago, Burlington and Quincy Railroad Co.; and H. L. Hamilton, president, Electro-Motive Corp.

in the same quantities that we make automobile engines, we could perhaps produce power for very much less than anybody today thinks it can be done.

"The method of putting the fuel in has been one of the great problems. We have all sorts of injection devices. Air injection was always very satisfactory from the standpoint of combustion, but had complications due to the very high pressures involved. We undertook to improve the so-called solid injection systems. The normal injection pressures used in the conventional diesel engine are around 4000 or 5000 lb. per sq. in. We went up to as high as 20 to 30,000 lb. to further subdivide the fuel.

Weight Can Be Cut

"The diesel engine has to run at very high pressures. The pressure before you ignite the fuel is around 650 lb. in a diesel and about 125 lb. in a gasoline engine. Efficiency goes up with the compression pressures. Consequently, the efficiency of a diesel engine is much higher than a gasoline engine. Because of the higher pressures, however, the engines had to be made heavier, but we set a top limit on weight as equal to that of a gasoline engine and no bigger.

"We therefore went to the two-cycle engine. It fired every time the piston came up and that meant that we only had to use half as many pieces, and with half as many pieces, our weight should go down. We have done that.

Injectors Extremely Accurate

"A diesel engine is always going to cost a little more than the gasoline engine, because the injectors

New 6" x 6" PEERLESS Improved HIGH DUTY METAL SAWING MACHINE

Automatically feeds the bar of stock forward to the gauge, automatically closes the vise, and automatically continues to repeat the complete cycle of cutting until the entire bar is cut to the length the gauge is set for, all without the attention of an operator.

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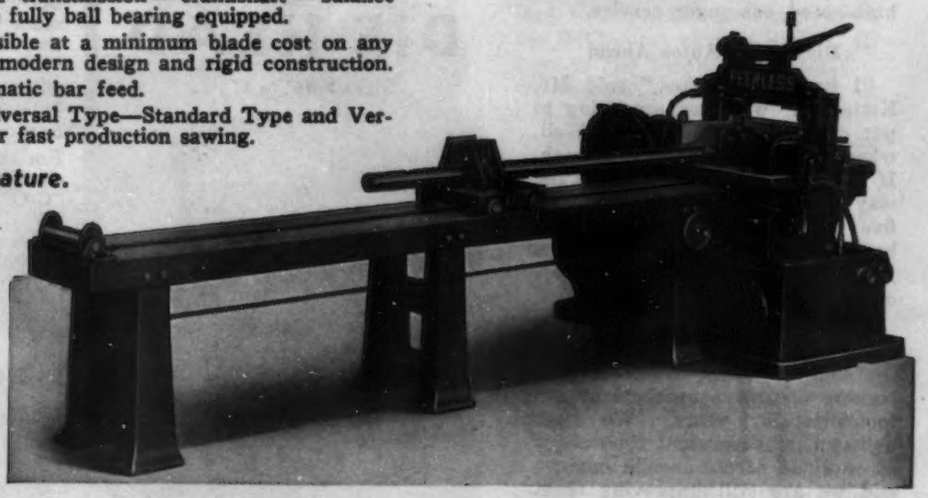

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are expensive to make. The limits on the pump for the very high-pressures at which they must operate are, a quarter of a tenth of a thousandth of an inch, or 0.000025 in. We have to make our injector plungers fit that close because if we didn't, the oil would leak by the plungers when the pressure was applied and the oil wouldn't get into the cylinders. The interesting thing about it is, that after they are made to that high degree of accuracy they apparently don't wear very much and the fine holes through which the oil is forced do not erode or wear out."

"From quite complete studies, and our experience with diesel power," Mr. Hamilton said, "we are convinced that were the Class 1 railroads to put 3000 diesel locomotives in switching service, this number of diesels, or about 25 per cent of the present locomotive inventory, would cover approximately 50 per cent of the present switching hours, and effect a saving in operating expenses of $52,000,000 yearly.

Tremendous Saving Possible

"This saving," Mr. Hamilton continued, "would be sufficient to fully liquidate the investment in diesel locomotives within five years, and would permit retirement, without replacement, of not less than 5000 old and obsolete steamers with their current excessive operating costs, which would more than meet the cost of acquiring diesels."

President Budd's address was the first comprehensive report on diesel locomotive operation by a major railroad. The Burlington was one of the first railroads to use diesel locomotives on a large scale in mainline high-speed passenger service, as well as in its switching service.

Mr. Budd referred to diesel locomotives as a "natural" in switching service, and reported that in passenger train operation they not only materially cut the cost of operation, but "what was more important, they greatly increased patronage." He predicted the coming use of diesels in mainline heavy freight service.

Possibilities Unlimited

"We have been so accustomed," he said, "to having progressive organizations like General Motors solve almost any problem to which their research and engineering departments set their minds, that it would be foolhardy to predict that diesel locomotives will not invade every field of railroad transportation.

"The experience of the last five years should prepare us for almost anything and it seems safe to say that railroad motive power has entered upon a period of steady improvement, and whatever developments occur, the public will be the beneficiary."

The Burlington president said the railroads had been anything but backward in adopting such an efficient machine as the diesel engine. He said diesel switching locomotives have been in process of perfection since about 1925, and that their use in high-speed trains began when the two-cycle principle and the strong new metal alloys reduced the diesel's weight from upwards of 150 lb. per hp. to 21 lb.

Operated at 65

"In the Middle West," Mr. Budd said, "several diesel trains are being operated distances up to 1000 miles daily, at an average speed upwards of 65 miles an hour. The Burlington operates four such trains. Diesels were chosen for

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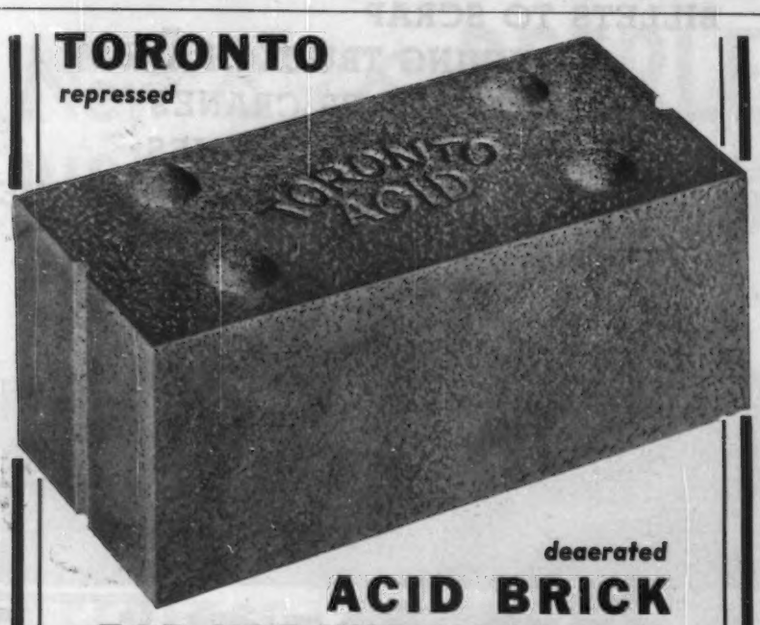
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these difficult schedules because they can make the fast time without running at excessive speeds. They weigh much less and are easy on tracks. Including fuel and water, the load that has to be transported in the locomotive itself is reduced by 40 per cent or more.

"On the Burlington's Chicago-Denver Zephyrs that means eliminating 300,000 ton-miles daily. Furthermore, as regards uniform speed, one of these trains on a 1000-mile run stands still for servicing en route about 40 minutes less than a conventional train.

Operating Costs Cut

"The cost per train mile for locomotive maintenance, fuel and lubricating oil on the four smaller Zephyrs (3 and 4 cars each) has been an average of 4.84c. The cost per locomotive mile for steam-drawn trains of the same carrying capacity has been 28.98c. For the larger trains comparisons are more difficult because we have no similar steam schedules.

"The first cost of a diesel, of course, is much more than that of a steam locomotive of corresponding power, but it seems conservative to say that one diesel can make as many service miles, year in and year out, as two steam locomotives. The extent to which an engine can carry out its assignment is of great importance. The 'on time' performance of diesels has been 96 per cent perfect, as compared with about 70 per cent for all locomotives."

He said current figures from railroads using General Motors diesel power in main-line passenger service show these trains travel a combined average of 19,420 miles a day, or in excess of 7,000,000 miles a year. Some of those locomotives, he said, have covered more than 500,000 miles without major overhaul.

Switching Service a "Natural"

"The diesel locomotive," Mr. Hamilton continued, "is a 'natural' in switching service because of its astonishing economy, greater initial starting effort, high availability, superior flexibility, greater safety, and work out-put. In 1936, Class 1 railroads spent about $35,000,000 for fuel for switch engines. Diesel switchers will normally reduce this expense 75 per cent. In ordinary switching service, one tank car of fuel oil covers as many service hours as 12 cars of coal.

"The railroads spent about $45,000,000 for repairing locomotives in switching service. Diesels will reduce this item approximately 50 per cent. About $16,000,000 was spent for roundhouse expenses. This service on diesels is negligible. Diesel switchers are normally available for not less than 8000

hours a year. Steam switchers are rarely available for more than 6000 hours a year.

"The full economy of diesel operation will not become effective until diesels completely supplant steam in a given engine district, thereby eliminating the supporting services of steam that are not needed for diesels, such as coal docks, water stations, track pans and water treating facilities."

Drop In Steel Jobs Is Slight

SEPTEMBER employment in the steel industry dipped only 0.1 per cent under August, despite a 11.8 per cent drop in steel output, the American Iron and Steel Institute reports.

While October job figures, still to come, probably will show a greater sag in employment, work-sharing in September kept 602,700 on steel payrolls compared with 603,100 last August and 527,000 in September last year.

Steel employees worked an average of 36.8 hr. per week in September to earn $86,161,000, 37.9 hr. in August to earn $92,663,000, and 40.5 hr. in September, 1936, to earn $65,611,000.

Because of a drop in overtime wage payments, average hourly earnings sagged to 84.3c. per hour in September compared with 86.1c. in August and 66.3c. in September, 1936.

Scrap Institute Meetings Planned

ANNUAL meetings of the Institute of Scrap Iron and Steel chapters are scheduled in part as follows:

Capital chapter, Troy, N. Y., Louis Contey, president, Nov. 4; New Jersey, Newark, N. J., Arthur J. Reichman, president, Nov. 8; New York, New York City, Joseph A. Moskowitz, president, Nov. 9; Philadelphia, Philadelphia, Arthur R. Robinson, president, Nov. 10; Cincinnati, Cincinnati, Hyman Moskowitz, president, Nov. 16; Northern Ohio, Cleveland, Sam Kasle, president, Nov. 17; Michigan, Detroit, Ben Kramer, president, Nov. 18.

A modernistic exhibit describing stainless steel and its uses in streamlined trains will be set up shortly in the Reading Terminal station, Philadelphia, by Edward G. Budd Mfg. Co., Philadelphia. Reading soon will place a Budd-built train in operation between Philadelphia and New York.

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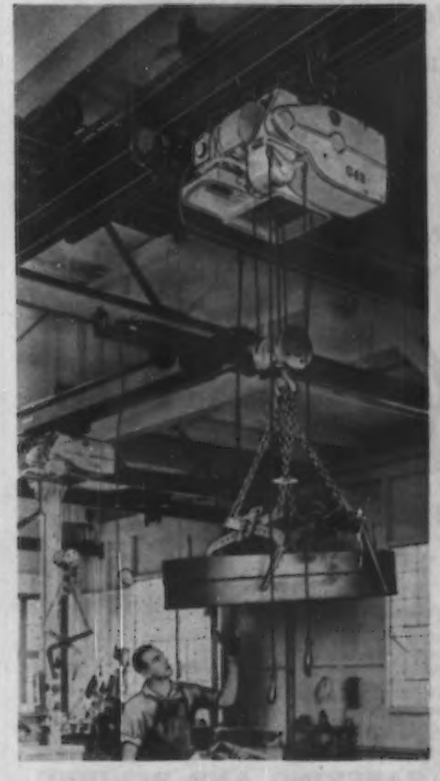

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Harnischfeger Corp. Sells 10,000th Crane

HARNISCHFEGER CORP., Milwaukee, sold its 10,000th crane early in November, according to Benjamin Van Horn, sales manager of the crane division, when Inland Steel Co., Chicago, placed an order for a 40-ton unit weighing 190,000 lb., for its works at Indiana Harbor, Ind. The crane will be used for handling large annealing housings. It supplements a substantial number of P & H cranes in use in Inland plants, purchased over a period of many years.

The manufacture of P & H cranes was started in 1891 by the Pawling & Harnischfeger Co., predecessor of the present Harnischfeger Corp. The 1000th crane was exhibited at the Louisiana Purchase Exposition at St. Louis in 1904. The 5000th crane was sold to a shipbuilding company in 1918.

The completion of the 10,000th crane some time in February, 1938, probably will be celebrated with a special program to mark the occasion, Mr. Van Horn said.

Japan to Increase Iron Production

LONDON (*Special Correspondence*).—Japan is confident that she will be able to increase her iron production from 700,000 to 1,700,000 tons per year by the utilization of the so-called Krupp-Renn patented process for the treatment of low-grade iron ores. The sole right to work the patents in Japan and Manchuria was recently acquired by a prominent Japanese industrial combine headed by the Mitsubishi Kogyo Kabushiki Kaisha.

The Krupp-Renn processes are first to be applied at the Showa Seiko Sho works. A contract for the supply of plant comprising eight large furnaces has been placed with Fried. Krupp Gruson Werke A.G. at Magdeburg-Buchau by Mitsubishi Shoji Kaisha G.m.b.H., Berlin.

The Krupp-Renn processes have been in use in Germany for several years at two large iron works. Fine-grain coke or coal is used as reducer, this enabling the iron to be recovered in the form of large metallic lumps. The process is to be used by the new State enterprise recently formed for the intensive exploitation of German low grade ores.

Mobile Belt Testing "Lab" Starts Tour

GRATON & KNIGHT CO., Worcester, has started a mobile belt testing laboratory on a tour of every industrial center of the United States. In a colorful, streamlined tractor-trailer truck, measuring 35 ft. long, 9 ft. high and 7 ft. wide, are set up testing equipment wherein leather belting can be tested under conditions averaging actual load conditions as they exist on metal working, textile, woodworking, paper machines and other industrial equipment.

The machines in the trailer unit may be operated either by a system of mechanical drive, using belts, pulleys and shafting or by a unit drive system. Incorporated in the transmission system is a drive on which all types of flat belts may be tested. This drive is equipped with a scale showing the belt tension and accurate readings of production efficiency can be made from a meter connected to the system.

A sales engineer will travel with the unit and work with local Graton & Knight representatives on all demonstrations.

Inspection Without Damage

A METHOD of inspecting machine parts for hidden flaws without injuring or changing them has been developed by the General Electric Co. According to J. A. Sams of the company's Schenectady works laboratory staff, the method depends on the principle that any substantial change in the constitution or state of magnetizable material will be reflected in its magnetic characteristics.

"A constant magnetic field is produced so that it penetrates through the entire thickness of a small area of the part to be inspected," says Mr. Sams. "The part is slowly revolved so as to change continuously the section within the field, until the whole part is magnetically explored. Imperfections such as voids or nonhomogeneous areas in the interior betray themselves by producing disturbances in the magnetic field at the surface of the part.

"Magnetic search coils are mounted close to this external surface. Any sudden change in the magnetic linkage, created by a discontinuity in the metal of the part, produces a corresponding sudden electric voltage in the external measuring circuit. The imperfection is detected and the defective part is discarded."

STEEL
HAS ADOPTED CONTINUOUS FLOW

THE Continuous Flow Principle has been knocking around in the world for nearly a hundred years—ever since the paper industry began to produce and printing presses began to print a continuous strip or sheet. Nearly every modern machine makes some application of this basic principle.

But Continuous Flow in Materials Handling is comparatively recent. Until Mathews engineers entered the field, materials handling was, apparently, only thought of as the solution of special situations occurring here and there.

Mathews engineers, however, took the stand that production in any mill or factory is a single process from start to finish and must be unified or integrated so that every machine, every department is in step with all others.

Today, this view is almost universally accepted—especially in the Steel Industry. Mathews engineers have been applying this basic principle for over 32 years.

Processing Equipment installed during 1936-37, embracing the ultimate in design and engineering in the Steel Industry, is illustrated and described in our catalog on Steel Plant Conveyers. Available now.

The leaders in this industry, responsible for 85% of steel production in the United States and Canada, are applying the Continuous Flow Principle of Handling Materials.

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CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS
CONVEYERS

Domestic Scrap Consumption in 1936 Amounted to 36,358,133 Gross Tons

AMERICAN industry consumed 36,358,133 gross tons of iron and steel scrap in 1936, an increase of 38 per cent over 1935, according to a survey completed by the Bureau of Mines, United States Department of the Interior. This large increase was made despite the sharp rise in scrap prices caused partly by the heavy export trade in that commodity during 1936.

Higher prices for scrap resulted in some substitution of pig iron in furnace charges (consumption of pig iron increased 46 per cent), but the survey indicated no major changes in furnace practice in any section of the country. Consumers in the principal steel-making regions used relatively more pig iron, but those situated in areas remote from pig iron supplies used relatively more scrap.

An interesting fact developed by the survey is that the industries of the United States used more scrap iron and steel than pig iron during the year.

Increase Tonnage Over 1935

Of the total scrap consumed in 1936, 17,456,744 tons was purchased material, i.e., scrap gathered through the ordinary channels of the waste material trade, whereas 18,901,389 tons was home scrap, most of which was obtained as a by-product in steel plant operations. These tonnages represent increases over 1935 of 34 per cent in the use of purchased scrap and 42 per cent in the use of home scrap.

Ferrous scrap or pig iron is consumed in all of the 48 states, in the District of Columbia and in Alaska. In 1936 the six largest steel-producing States, Pennsylvania, Ohio, Indiana, Illinois, Michigan and New York, consumed 78 per cent of the scrap and 83 per cent of the pig iron. Pennsylvania was the leading consumer, accounting for 24 per cent of the scrap and 30 per cent of the pig iron. Seventy-two per cent of the scrap and 73 per cent of the pig iron used in 1936 was charged to open-hearth furnaces.

Greater Quantity of Scrap Used

The conservational aspects of scrap utilization are illustrated by the fact that the quantity of scrap consumed in 1936 was 37 per cent greater than the total iron content of domestic and foreign iron and manganiferous ores used by domestic iron and steel manufacturers; purchased scrap alone amounted to 66 per cent of the iron content of the ores used.

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Carpenters Get Germless Nails

FOR many years carpenters, lathers and other craftsmen used their mouths as supply boxes for nails. Some craftsmen worried about the germs on the nails.

This week that worry ended. The American Iron and Steel Institute announced that sterilized steel nails—heated to destroy bacteria and packed in sterilized paper-lined kegs—are now a regular product of the steel industry.

British Steel Output 31% Over 1929 Level

LONDON (*Special Correspondence*).—A valuable survey of the recent progress of the British iron and steel industry was made by Sir Walter Benton Jones at the annual meeting of the United Steel Companies combine, of which he is chairman.

Referring to the outlook for the steel industry, Sir Walter pointed out in the first half of 1937 Western Europe had not quite regained the 1929 level, while the United States had just passed it. Britain, however, had passed the 1929 level by 3,000,000 tons per annum, or 31 per cent.

"We consumed steel at a rate 30 per cent higher than in 1929," he added. "Our exports, which have been stationary for the last three years, were still only at two-thirds of the rate at which we exported in 1929, but they exceeded the rate of the previous three years by 500,000 tons.

"In Britain the regulation of imports will insure us a generally higher level of production for home use. The raw materials we possess and the geographical advantage of close proximity to the high seas make export trade more easy for us than for many other countries. For these reasons it seems certain that the production of steel in Britain is now established at a permanently higher level."

Fifth Edition of Timken Engineering Journal

A COMPLETE revision of the General Information Section of the Timken Engineering Journal has just been completed and copies are available upon request to The Timken Roller Bearing Co.

The data presented in this 294 page loose-leaf volume which is furnished in a standard 8½ in. x 11 in. three ring binder with stiff covers include a general discussion of the design and types of Timken bearings now available, a discussion of ratings and bearing selection, methods used for calculating bearing loads for a wide range of fundamental applications, and complete detailed information as to bearing sizes and load carrying capacity. For the convenience of designers accurate full and half size detail bearing drawings are presented for the complete list of single row Timken bearings up to an outside diameter of 14 in.

Detailed information as to standard shims for both cup and cone adjusted bearings, locknuts and washers, annular groove closures and standard tubes is included. The methods of mounting are discussed, as well as shaft and housing design and much new information is given on closures for use with Timken bearing applications. A special section on cup and cone fitting practice is included, and specifications for lubricants for use with Timken bearings, under a wide range of conditions of load, speed and temperature are given.

In addition to the revised section just released, additional supplementary sections covering applications in such special fields as conveyors, shop trucks, mine cars, farm machinery, aircraft and oil field equipment are likewise available upon request.

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Foot valve 2 operates valve 3 to engage the clutch, also valve 5 to clamp the work with cylinder 6 whose return stroke speed is controlled by valve 7 and operated by valve 4. The cam on the spindle also operates valve 1 to disengage the clutch. Constant Pressure cylinders 8 return the ram to top of stroke.

You, too, can automatically operate your machines for less!

THE TOMKINS-JOHNSON CO., 628 N. Mechanic St., Jackson, Mich.

Rails Need Rate Boost, Heavy Equipment Buying, Dunn Says

ONLY "an early large increase in expenditures for equipment and maintenance" can halt the five-year decline in general condition of railroad property in the United States, Samuel O. Dunn, editor of *Railway Age*, told the Cleveland Advertising Club.

Warning that the American people "have a more vital interest" in the case for a general advance in freight rates, (on which equipment buying depends), than "they have ever had in any action involving the future of any of their great industries," Mr. Dunn declared the Interstate Commerce Commission's coming ruling on the carriers' request for a 15 per cent freight rate increase will determine whether:

(a)—The railways will be able to resume large scale buying of equipment to aid business recovery.

(b)—The roads can enlarge and improve their service sufficiently to meet demands of the shipping and traveling public.

(c)—Government ownership and operation of railroads (one-third of American railroads are already in bankruptcy) will have to be adopted.

Concluding that the ICC appreciates the gravity of the situation, Mr. Dunn said that large increases in operating expenses and taxes, without higher rates received by other large industries in the form of price advances, have "completely disrupted" the economic balance between other industries and the railroad industries.

"Solution of the immediate problem is obvious and simple," said Mr. Dunn, "It is to restore railway freight revenue to a parity with wholesale commodity prices and thereby, as nearly as practicable, restore railway and employing buying power to a parity with those of other large industries."

How rapidly demand for rails, car wheels, splice bars, tie plates and similar steel products for railroad use dropped in July, August and September in comparison with other products is shown in an American Iron and Steel Institute report, THE IRON AGE of Nov. 4, page 86-C.

Resisting the Destructive Grinding of Sharp Sand

INSUROK GEARS give 200% Longer Life and Service

Operating in a continuous storm of cutting, destroying, grinding sand, this INSUROK pinion, driving a sand-blast machine, is subject to constant grueling punishment. Yet, INSUROK gives four times the life and service of the finest metal gear previously used.

Such are the inherent characteristics of INSUROK . . . tough, durable, wear resisting . . . that make it first choice where difficult conditions are encountered. These same qualities recommend INSUROK gears to effect economies and to improve performance in your production equipment.

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Third Of Inland Workers Above 40

INLAND STEEL CO., refuting frequent reports that men more than 40 years of age cannot find jobs in industry, announced that in October the company employed 4257 men above that age at its Indiana Harbor plant.

The Inland company has 23 employees between 70 and 77; 57 above 65 (retirement age under the social security program) and 3002 between 40 and 50 years, with 1015 between 50 and 60, and 156 between 60 and 65.

A total of 32.7 per cent of the 12,928 employees at Inland's Indiana Harbor plant in October are above 40 years of age.

Coming Conventions

Nov. 10 to 12—International Acetylene Association, 38th annual convention, Hotel Tutwiler, Birmingham, Ala. H. F. Reinhard, 30 East 42nd Street, New York, secretary.

Nov. 17 to 18—Purchasing Agents Association of Chicago, Hotel Sherman, Chicago. Frederick J. Heaslip, Fairbanks, Morse & Co., Chicago, secretary.

Dec. 1—American Standards Association, Astor Hotel, New York. Dana D. Barnum, 29 West 39th Street, New York, is president.

Dec. 6 to 10—Personnel Research Federation, Hotel New Yorker, New York. C. S. Slocombe, 29 West 39th Street, New York, director.

Dec. 6 to 11—Exposition of Chemical Industries, Grand Central Palace, New York.

Jan. 12 to 14—Institute of Scrap Iron and Steel, Ambassador Hotel, Atlantic City, N. J. B. H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J., is in charge of arrangements.

Jan. 24 to 28—International Heating and Ventilating Exposition, Grand Central Palace, New York.

Cartel Bans Exports To Some Chinese Ports

LONDON *(Special Correspondence)*. — The International Steel Cartel has given instructions to its members not to make shipments of steel to certain Chinese ports, including Shanghai, Hong Kong, and Tientsin.

For some time past there have been considerable difficulties with the Far Eastern market and recently there has been very little, if any, business going through. The financial position is at present regarded as highly speculative.

Semi-Finished Steel Products Defined

DEFINITIONS of the primary group of semi-finished steel products are an important feature of a pamphlet recently issued by the American Iron and Steel Institute. The pamphlet comprises section 2 of a projected "Steel Products Manual." Section 1, which was published in September, related to pig iron and ferroalloys.

Commonly available sizes, qualities and chemical composition ranges for ingots, blooms, billets, slabs and sheet bars are described in the pamphlet. Manufacturers' Standard Practices for sampling, chemical analysis and permissible variations in weight are also presented.

From time to time further sections of the "manual" will be issued by the institute, covering other major classes of products as well as general sections dealing with manufacturing tolerances, methods of inspection, sampling and chemical analysis, definitions of technical terms, etc.

Copies of either of the first two sections can be secured from the American Iron and Steel Institute, 350 Fifth Avenue, New York, at the following cash, post paid prices:

	Each
1 to 10 copies of one section	15c.
11 to 50 copies of one section	12½c.
51 to 100 copies of one section	10c.
Over 100 copies of one section	7½c.

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Reeves Vari-Speed Motodrive

• OF COURSE the operator of a REEVES-equipped machine can give a good account of himself! The correct speed for every job is at his finger-tips. Merely by turning the control handwheel, he secures any speed over an infinite range between fastest and slowest—instantly, accurately!

. . . Fullest advantages of variable speed control are secured only when the *correct* unit is applied. REEVES engineers have developed a complete line of variable speed equipment—based on the three units shown at left. A wide variety of modern, time-tested units is available, in proper sizes, designs, speed ratios and controls to match any specific requirement . . . The nation-wide REEVES engineering organization is at your service, without obligation.

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Reed-Prentice Corp. Celebrates Sixty-fifth Anniversary

THIS year marks the 65th anniversary of the Reed-Prentice organization which in 1872 began with the manufacture of lathes and drilling machines under the name of A. F. Prentice & Co. In 1875, F. E. Reed, connected with A. F. Prentice & Co., purchased a half interest in the business and in 1877 he purchased the remainder to form the F. E. Reed Co. Albert F. Prentice and Vernon F. Prentice then started Prentice Bros. which was consolidated with F. E. Reed in 1912 to form the present organization. F. E. Reed devoted his entire attention to the manufacture of lathes which became known the world over, while Prentice Bros. confined their manufacture chiefly to drills. In 1905 they developed the first geared head lathe which met with immediate success.

In 1922, Reed-Prentice absorbed the Whitcomb-Blaisdell Machine Tool Co. of Worcester and the Becker Milling Machine Co. of Hyde Park, Boston. One of the branches of the Whitcomb-Blaisdell organization, namely S. C. Coombs & Co., started in 1837. This firm later became Shepard & Martin Lathe, then Lathe & Morse, then Draper Machine Tool Co. which merged into the Whitcomb-Blaisdell Machine Tool Co. in 1905. The Whitcomb branch of the Whitcomb-Blaisdell Company started under the name of P. Whitcomb & Co. in 1849, later becoming Whitcomb Mfg. Co. until 1905 when it was merged with Whitcomb-Blaisdell Machine Tool Co. The P. Blaisdell branch was established in 1865 and continued until 1905 when it was merged with Whitcomb-Blaisdell Machine Tool Co. The Kabley Foundry, another branch of Whitcomb-Blaisdell, was founded by Arnold Kabley and Alonzo Whitcomb and F. E. Reed. W. H. Whitcomb later purchased and organized Whitcomb Foundry which continued until the merger with Whitcomb-Blaisdell Machine Tool Co. in 1905.

The Becker organization was instituted by John Becker in 1890. In that year, Mr. Becker, a manufacturer of brass and steel stamps and stencils in Fitchburg, Mass., placed on the market the well known Becker milling machine. Mr. Becker later moved to Hyde Park, Boston, to operate under the name of Becker-Brainard Milling Machine Co. which was superseded by the Becker Milling Machine Co. in 1915.

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MORE THAN A CATALOG . . . . REALLY A TREATISE ON GEARS

Just off the press . . . this book contains 72 pages of good solid design and construction facts . . . gear rules, tables, diagrams, stock gear and hob lists . . . helpful data for specifying and buying. In fact, there's all the information you could need or want—in convenient form, ready for instant reference.

Send for your copy *now* . . . and ask, too, for literature on the well known Philadelphia Speed Reducers and MotoReduceR. You'll be interested.

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Industrial Gears and Speed Reducers

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New Book on Weights And Measures

THE perennial argument of the metric system of weights and measures versus the English system is revived again in the book "Modern Weights and Measures" by W. R. Ingalls which has been recently published by the American Institute of Weights and Measures.

The book contains a scholarly and logical discussion of the merits and demerits of the two systems, and describes the confusion that would result should the metric system be made compulsory in the United States.

Copies of the book may be secured from the institute's office at 33 Rector Street, New York, at a cost of $1 per copy.

NLRB Orders Vote For Borg-Warner

WASHINGTON, Nov. 9.—The National Labor Relations Board today scheduled an election within 10 days at the Calumet Steel Division of Borg-Warner Corp., Chicago, to allow production and maintenance workers among the plant's 575 employees to select their union for collective bargaining.

Workers will vote for either the Amalgamated Association of Iron, Steel and Tin Workers Union or the Chicago Heights Steel Workers' Protective Association.

Cars Crash In Bridge Exhibit

TWO automobile race drivers smashed their cars at Toledo, Ohio, last Sunday on an ordinary wooden decking bridge in a demonstration by the Blaw-Knox Co., Pittsburgh, of its Blaw-Knox Irving open steel bridge decking.

Before crashing, the two drivers, handling their cars at the same rate of speed, drove over the Blaw-Knox decking, consisting of a mesh of steel bars placed on end and riveted, and stopped suddenly without damage.

The test, carried out on two Toledo bridges which had been soaked to duplicate rainy day conditions, drew throngs of sightseers.

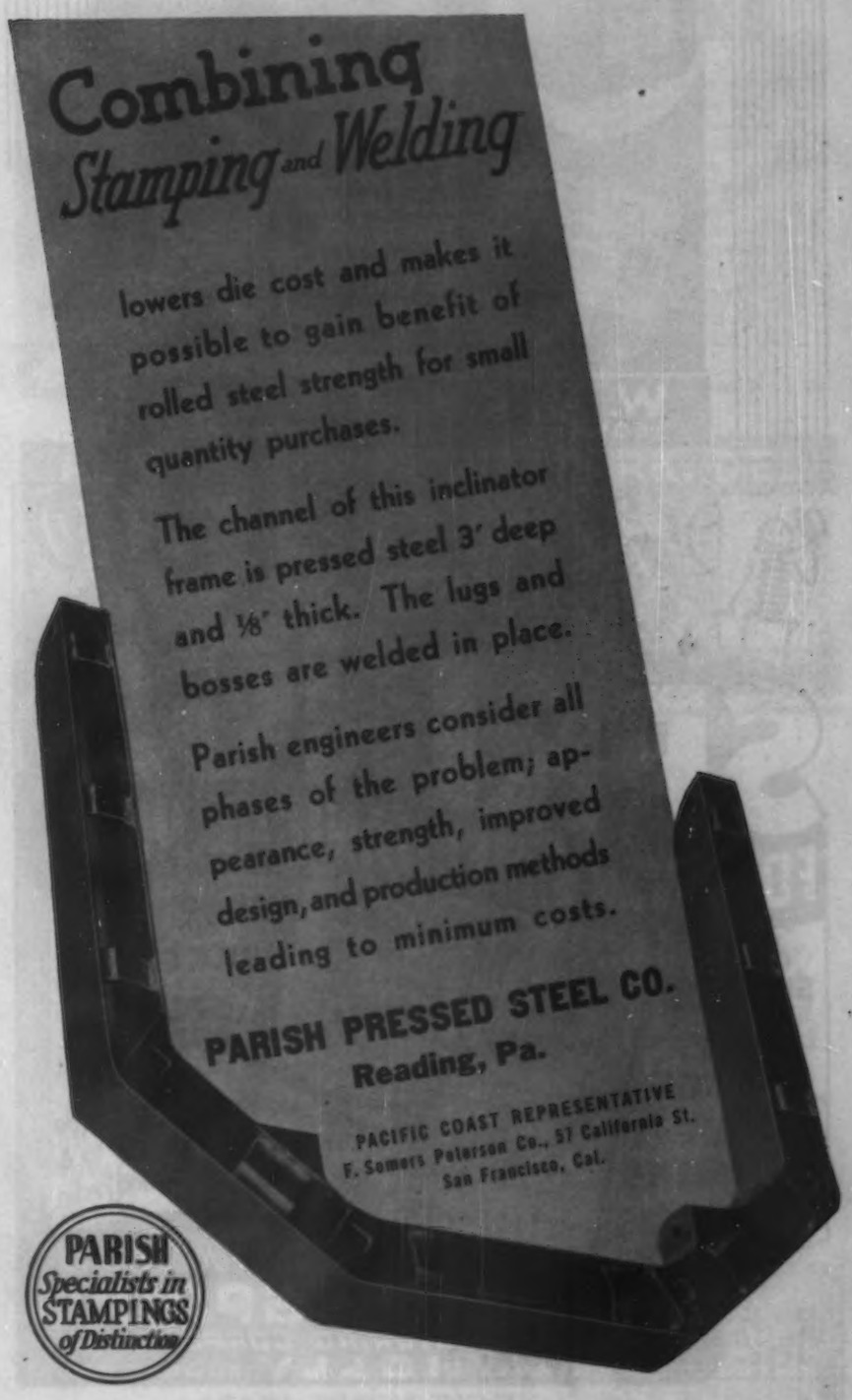
Automobile Sales By Factories Increased Sharply in October

AN increase of 94 per cent in factory sales of automobiles in October over September is reported for members of the Automobile Manufacturers Association, which includes all domestic makers with the exception of Ford. The totals were 340,920 and 175,620 respectively.

Shipments during the first 10 months totaled 4,295,933, representing a gain of 16 per cent over the corresponding 1936 figure of 3,691,517, and is the largest 10-month volume on record, with the exception of 1929.

Ford's factory sales for October are estimated at 2968 by Ward's Automotive Reports, making total assemblies for the month 343,888 units. In October, 1936, 230,049 passenger cars and trucks were assembled in the United States and Canada, giving a gain of 49.5 per cent for October, 1937.

General Motors Corp. announced its October sales to dealers in the U. S. and Canada, together with shipments overseas, as 166,939 units, representing a gain of 84 per cent over the 90,764 cars and trucks sold to dealers in October, 1936. The gain over September, 1937, was even greater, being 103 per cent above the 82,317 units sold in that month. Sales for the first 10 months totaled 1,761,317 units as compared with 1,606,856 for the same period in 1936, a gain of 9.5 per cent. Sales to consumers in the United States totaled 107,216 cars in October, compared with 44,274 a year ago. Sales in September were 88,564. Sales for the first 10 months were 1,387,146, compared with 1,391,189 for the same 10 months of 1936.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lowers die cost and makes it possible to gain benefit of rolled steel strength for small quantity purchases.
The channel of this inclinator frame is pressed steel 3' deep and ⅛" thick. The lugs and bosses are welded in place.
Parish engineers consider all phases of the problem; appearance, strength, improved design, and production methods leading to minimum costs.
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Specialists in
STAMPINGS
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Thermostatic BIMETAL
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PERFEX
AUTOMATIC CONTROLS"
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PERFEX Warm Air and Fan Controls maintain accurate temperatures in warm air furnaces, ducts, and drying chambers.

Chace Thermostatic Bimetal is the active element used in these Perfex controls. If you desire your product to act automatically at any given degree —use "Chace."

If your job can be done with Bimetal, Chace can serve you.

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SPECIAL SPRINGS
from Every Type of Wire up to & including ½ dia.

Send for Quotations
AMERICAN SPRING
AND MANUFACTURING CORPORATION
PARK AVE. HOLLY MICHIGAN

Iron and Steel Imports Lowest Since March, 1935

(CONTINUED FROM PAGE 81-D)

7952 tons received in August and 15,080 tons in September a year ago, and came from British India (5740), the Netherlands (1506) and Canada (465).

Imports in the nine-month period of 1937 amounted to 373,829 tons, valued at $19,536,820 in comparison with 390,627 tons valued at $16,151,093 in the corresponding period of 1936. The principal product imported in the first nine months from a quantity standpoint was pig iron, despite the sharp drop to 84,038 tons from the 137,607-ton total last year. Next came shapes 64,552 tons against 41,135 tons last year, followed by merchant steel bars, at 37,990 tons this year, from 28,889 tons in the corresponding period of 1936. Belgium was the leading source of imports, supplying 115,542 tons in the first nine months, in comparison with 80,877 tons in the like months of 1936. Germany's total of 63,570 tons ranked next, followed by British India, 50,860 tons, and Sweden, 31,491 tons.

Details of exports of iron and steel products from the United States appeared last week on page 86.

. . TRADE NOTES . .

General Welding & Equipment Co., Cambridge, Mass., manufacturer of automatic shape cutting machines, has appointed the Machinery & Welder Corp., 312 North Loomis Street, Chicago, and 513 East Buffalo Street, Milwaukee, as its exclusive distributer in Chicago and adjacent areas. Machinery & Welder Corp. has represented the company for the past year in a part of this territory, but it now distributes in the territory covered by its five branch offices. The other offices are in St. Louis, Kansas City and Moline.

SKF Steel, Inc., 369 Lexington Avenue, New York, has opened at 110 Frelinghuysen Avenue, Newark, N. J., its principal warehouse for storing tool steels and chrome steel tubing and bars.

Evans Metal Co., Atlanta, Ga., announced the opening of its office and plant on Nov. 2 at Piedmont Road and the S.A.L. Railroad, Atlanta. C. F. Evans is president and S. N. Hightower, secretary and treasurer.

Shafer Bearing Co., Chicago, manufacturer of radial thrust roller bearings, pil-

low blocks and other mounted units, has appointed as direct factory representative in Michigan H. H. Barrows, of the Industrial Equipment Co., 2842 W. Grand Boulevard, Detroit. The Industrial Equipment Co. is also district representative for the American Flexible Coupling Co., Cleveland Worm & Gear Co., and William W. Nugent & Co. Detroit Ball Bearing Co. will continue as the stock carrying distributer in Detroit and vicinity for the Shafer Corp.

Republic Steel Corp., Cleveland, through Norris J. Clarke, vice-president in charge of sales, announces the following new distributers for tubular products: Bomar Gross, Inc., Jamaica, N. Y.; Drake Supply Co., Los Angeles, Cal.; Iowa Machinery & Supply Co., Des Moines, Iowa; Wilkins Pipe & Supply Co., Peoria, Ill., and Woodmanse Mfg. Co., Freeport, Ill.

Economy Pumps, Inc., has moved its general offices to 2522 West Congress Street, Chicago. The company's factory and engineering department are at Hamilton, Ohio.

F. F. Gilmore & Co., Boston, importers of industrial diamonds and makers of diamond tools have appointed Federated Sales Service, Inc., 729 Boylston Street, Boston, as their sales and marketing counsel. F. F. Gilmore & Co. will build up a national sales force of manufacturers' agents.

Roots-Connersville Blower Corp., Connersville, Ind., has appointed as distributers of turbine pumps the Buffalo Mill Supply Co., Inc., 210 Main Street, Buffalo, and F. W. Allen & Son, 2658 W. 26th Street, Erie, Pa.

Follansbee Company Given More Time

A COURT order has been entered extending the confirmation of the plan of reorganization of Follansbee Brothers Co., Pittsburgh, to Feb. 4, 1938. The purpose of the extension is to allow the company to make other financial arrangements.

The Houston, Tex., warehouse, formerly operated by Carnegie-Illinois Steel Corp. and used jointly as a Southern terminal by several subsidiaries of U. S. Steel Corp., has been placed under the management of the Tennessee Coal, Iron & Railroad Co. of Birmingham. Transfer of the warehouse to T. C. I. management was effected in order to serve the Southern steel trade more efficiently.

Air conditioning equipment sold by members of the Air Conditioning Manufacturers' Association in 1937 will approximate $85,000,000 compared with $53,000,000 in 1936, the association reported following its recent fall meeting in Chicago.

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STRONG
DURABLE

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HIGHLY RESISTANT TO HOT ACIDS

HAVEG molded phenolic resin asbestos composition tanks are unaffected by HCL in all concentrations and at all temperatures up to 265°F.; or by Sulphuric acid up to 50% concentration, even at boiling. One piece seamless HAVEG tanks can be made as large as 9'6" long x 6' wide x 6' deep, or as long as 13' with a proportionate reduction in cross sectional dimensions. Larger units can be furnished by bolting together two or more seamless sections with gaskets between the joints. Other HAVEG acid resistant equipment includes cylindrical tanks, kettles, towers, standard pipe and fittings, and standard fume duct. Technical data bulletins are available on all HAVEG equipment. We suggest you send for our newest bulletin IA-1.

CLEVELAND, OHIO LOS ANGELES, CALIF. OMAHA, NEBRASKA DETROIT, MICH.
CHICAGO, ILL. CINCINNATI, OHIO TULSA, OKLA.

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We have large and efficient facilities for producing metal products of unusual character, employing within one building the widest range of services—*metal stamping, wire forming, embossing, etching, lithography, coining, enameling, welding,* all types of *plating* including the very latest development of *electro-color plating* —and have our own *tool, machinery, art, research* and *laboratory* departments.

We have consistently served many leading industries in volume production on difficult, exacting and quality specifications.

Consult Grammes about metal products, particularly if they call for craftsmanship and the unusual in finish.

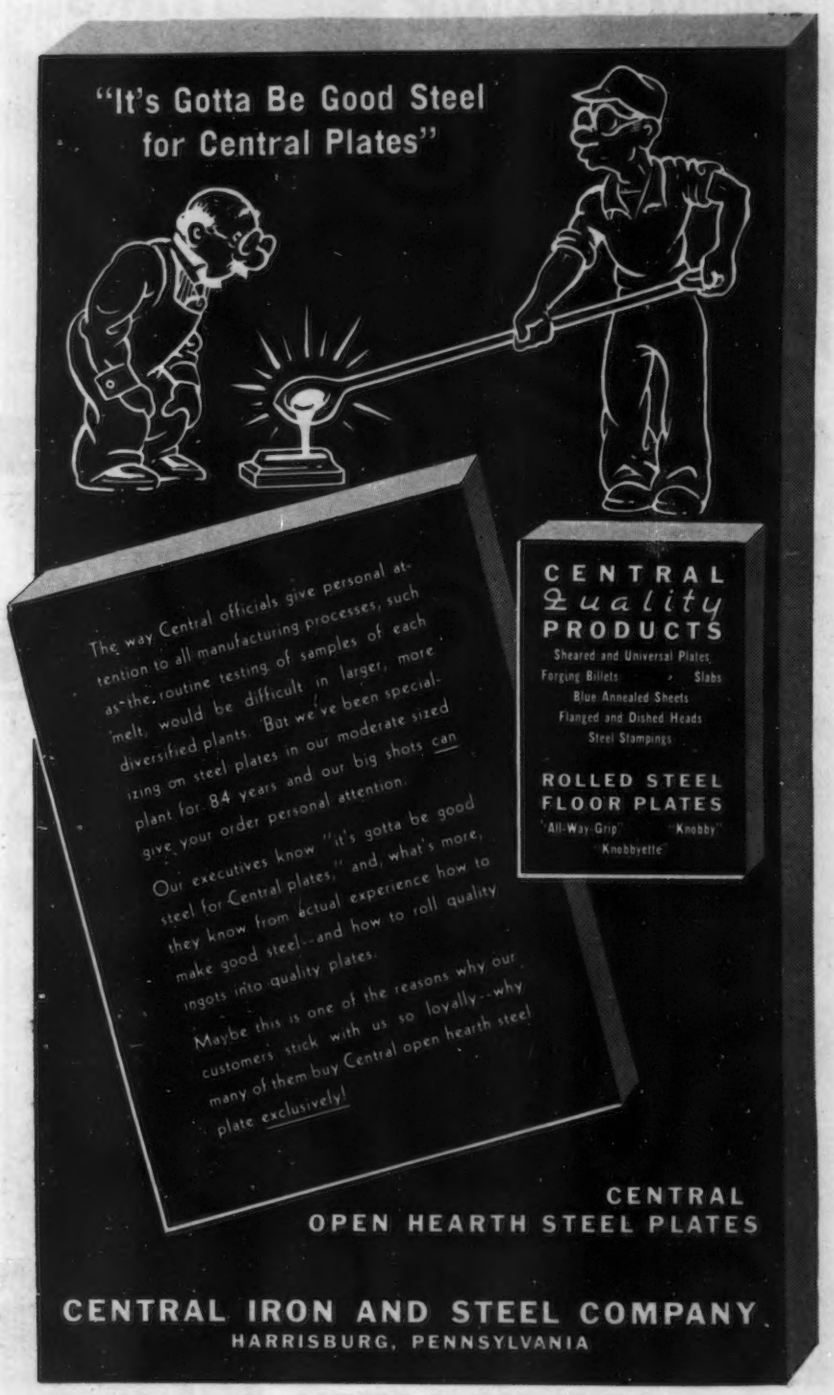
L. F. GRAMMES & SONS, INC.
ALLENTOWN, PENNA.

Sprayed Metal for Crankshaft Journals

IN a paper presented before the regional transportation and maintenance meeting of the Society of Automotive Engineers, held at Newark, N. J., Nov. 9 and 10, W. J. Cumming of the Surface Transportation Corp., New York, brought out an unusual method for building up worn crankshaft journal bearings in bus engines. The procedure is simple and the results effective, according to Mr. Cumming, provided the shaft is prepared correctly. It consists of spraying high-carbon steel in the ductile state on the prepared shaft and then grinding to the original size of journal.

100,000 More Bus Miles

The worn shaft is first ground to a diameter that will give a sprayed bushing of sufficient thickness to withstand the pressures involved, usually 0.060 in. after finish grinding. The rough ground area is then shot blasted and as many nicks or gashes cut as are necessary to securely anchor the high-carbon steel bushing to the shaft. The sprayed metal flows evenly and smoothly into the prepared keyways. Mr. Cumming stated that practically all the older buses had sprayed crankshaft bearings and that many of these reconditioned engines had gone over 100,000 bus miles.


"It's Gotta Be Good Steel for Central Plates"
The way Central officials give personal attention to all manufacturing processes, such as the routine testing of samples of each melt, would be difficult in larger, more diversified plants. But we've been specializing on steel plates in our moderate sized plant for 84 years and our big shots can give your order personal attention.
Our executives know "it's gotta be good steel for Central plates," and, what's more, they know from actual experience how to make good steel--and how to roll quality ingots into quality plates.
Maybe this is one of the reasons why our customers stick with us so loyally--why many of them buy Central open hearth steel plate exclusively!
CENTRAL Quality PRODUCTS
Sheared and Universal Plates
Forging Billets Slabs
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Flanged and Dished Heads
Steel Stampings
ROLLED STEEL FLOOR PLATES
"All-Way-Grip" "Knobby"
"Knobbyette"
CENTRAL OPEN HEARTH STEEL PLATES
CENTRAL IRON AND STEEL COMPANY
HARRISBURG, PENNSYLVANIA

Iron Sands Treated By Duffield Process

THE extraction of high-grade iron from the iron sand deposits at Taranaki, New Zealand, has now been embarked upon by the Duffield Iron Corp., London. The firm is using its own process and claims that the iron produced is practically free from impurities.

Process Is Economical

The Duffield process was designed to deal with ores in a fairly divided state. It employs the briquetting process and does not use a blast furnace. The iron sand, plus a correct proportion of pulverized coal, is converted into briquettes and charged into a furnace. Reduction then takes place in the body of the briquette, the contents of which are sealed by a film of molten slag which effectually prevents oxidization. This chemical process within the briquette continues until a spongy iron is produced which, sinking through the slag, produces an iron matte upon the hearth of the furnace. After withdrawal this matte is charged into an electric furnace for refining. The entire process is claimed to be exceedingly economical.

Tests of the Duffield process using New Zealand sand have revealed (1) the remarkable rapidity (20 min.) with which the manganese oxides in the sand were reduced to a semi-molten state, (2) the gratifying feature that almost all the titanium oxide joined the bath of basic slag, only 0.02 per cent remaining in the iron, (3) the high state of purity of the iron, and (4) the economic aspect generally of the process for the New Zealand sands.

Buildings That Tell Their Own Production Story

(CONTINUED FROM PAGE 57)

familiar with the problems presented by steel building construction. When the old Armco laboratory building at Middletown was destroyed by an explosion, the possibility of making its successor a practical demonstration of all-steel construction immediately occurred to its promotion-minded management. Thus this research laboratory, just completed, applies 11 products of the Armco mills and fabricating plants in a structure which profits by far-reaching experience in their use.

Galvanized channel sections form the nucleus for the exterior walls which carry the cream colored porcelain panels of Armco ingot iron. Stainless steel provides contrasting wall stripes and framing for the windows. Inside one finds the wall enclosed with walnut finished furniture steel, which also is used throughout partitions in the office section. Insulated steel walls, filled with a mineral product similar to mica, which acts as a barrier against heat and sound, have been used in the laboratory partitioning. This, as well as the perforated, acoustic, channel type roof deck and ceilings in main laboratory and office sections, are other subsidiary products, while large amounts of galvanized sheet iron made and sold by the company itself have been used as covering for the roof deck and in a maze of ducts for office and laboratory air conditioning and the latter's fume disposal systems. In addition, Venetian blinds made from light gage metal have been installed in all the windows, stainless used in all the outside doors and hollow steel panels in those in all interior partitions.

A dignified streamlined design consistent with such modern materials has provided Armco with a colorful advertisement for the newer flat rolled products which it vigorously promotes.

Glass block, made by the Owens-Illinois Glass Co. and an important element in the daylighting and insulation of the air-conditioned Armco building, found interesting applications in plants for the company itself. While the company in its research building at Toledo enclosed all four sides solidly with glass block to demonstrate the fullest application of its product, more recent plants for Owens-Illinois have been content with the functional application of this product. One of the more interesting of these projects is the warehouse and corrugated container factory built by us at Gas City, Ind., where the company's manufacture of catchup bottles and prescription ware is concentrated. Scientific interior layout of the structure is reflected by the arrangement of more than 42,000 glass blocks in the outer walls. Laid in horizon-

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. . . are manufactured to highest standards . . . they require little maintenance—give long years of satisfactory service. Belt conveyors for a wide variety of bulk materials, apron conveyors for hot and abrasive materials, screw conveyors when the head room is limited, flight conveyors, drag conveyors, and wooden slat conveyors for finished products and packages in an almost endless variety of different types and sizes, are included in the complete line. Capacities to meet any requirement. Complete details and a fully descriptive catalog will be sent on request. What are your conveyor requirements?
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DUST COLLECTORS · CONVEYING AND ELEVATING EQUIPMENT OF ALL KINDS · ROTARY DRYERS AND COOLERS
BOILER PLANT COAL AND FOUNDRY SAND HANDLING EQUIPMENT · CHAINS, SPROCKETS AND BEARINGS
STEEL DRUM PAINTING, PAINT DRYING AND DRUM RECONDITIONING EQUIPMENT

tal panels which provide streamline detail, they meet specific illumination requirements in each section of the building, which is 540 ft. long and 100 ft. wide.

Panels of glass block throughout the building have been restricted to sizes required by their location and their function. Eight horizontal panels, each 61 ft. 5 in. long and 8 ft. 7 in. high, admit abundant glareless daylight along the corrugating and box production line, while tall panels, 12 ft. 10 in. high and 3 ft. 6 in. wide, admit light to the two-story roll storage room where paper for the plant is stocked. Consistent with their function, small glass block panels throughout warehouse sections of the building are at ceiling height, while three towering shafts ornament the entrance and illuminate the stair at the north end.

The adaptability of glass block to interior partitions is well illustrated in the superintendent's office at this Gas City plant. Situated on the second floor, it has glass block partition walls with inset windows of clear glass on three sides. The superintendent can see into the roll storage room on the floor below through a window in the glazed tile wall which separates the paper storage from other portions of the structure on the fourth side.

The use of other glass products is also illustrated in the Gas City building, which has a 4-in. layer of glass wall for insulation and sound absorption in the roof.

In each of these new plants the manufacturer has demonstrated confidence in his own products, but this was more than merely practicing their preachment. The actual job of construction served as a demonstration of the most efficient use of their own products and armed them with concrete evidence of the merit of the materials and processes they have to sell.

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COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

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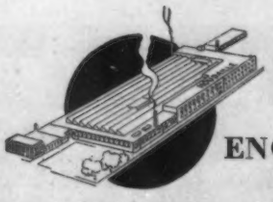

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Jobs In Industry Dip 1.5 Per Cent

TOTAL of employees working in 25 manufacturing industries declined 1.5 per cent from August to September while total man-hours worked dropped 3.1 per cent and payroll disbursements sagged 2.6 per cent, the National Industrial Conference Board reports. Average hourly earnings were 0.3c. higher, while the average work week in September was 38.3 hr. against 38.9 hr. in August.

Purchasing power or "real" earnings of industrial employees declined 1.6 per cent in September as a result of an increase in living costs.

American Oxygen Service Corp., Harrison, N. J., has begun construction of plant extension 100 x 108 ft., two-story adjacent to its present plant, to cost $135,000 with equipment. Mahony-Troast Construction Co., Passaic, N. J., and Truscon Steel Co. are general contractors.

. . CAST IRON PIPE . .

Hartford, Conn., is considering alternate bids on 10,250 ft. of 6 to 20-in., class 150, and 487,213 ft. of 6 to 20-in. pit cast pipe.

Easton, Pa., plans 16-in. main pipe line to connect reservoir in College Hill district with standpipe on Fifteenth Street. Cost about $38,000. C. A. Reese is city engineer.

Yorkville, Ohio, plans 6 to 12-in. pipe for main water lines; also pumping equipments and other waterworks installation. Cost about $50,000. P. W. Elwell, 5005 Euclid Avenue, Cleveland, is consulting engineer.

Corning, Ohio, plans about 16,665 lin. ft., various sizes, for extensions in water system. L. C. Gibson, Zanesville, Ohio.

Wellsville, Ohio, will take bids soon for pipe for extensions in water system and other waterworks installation. Cost about $164,000, including grant of $73,000 secured through Federal aid. R. W. Hunter, 241 Beverly Road, Wooster, Ohio, is consulting engineer.

Sonora, Tex., closes bids Nov. 22 for 3540 ft. of 8-in., and 20,850 ft. of 6-in. for extensions in water system; also for about nine tons of cast iron specials, chlorinator plant equipment and other waterworks installation. H. R. F. Helland, Frost National Bank Building, San Antonio, Tex., is consulting engineer.

Crockett, Tex., plans pipe lines for extensions in water system; also other waterworks installation. Cost about $25,000. Terrell-Bartlett Engineers, Inc., Smith-Young Tower, San Antonio, Tex., is consulting engineer.

Seminole, Tex., will take bids soon for 11,300 ft. of 2, 6 and 8-in. for water system; also for 50,000-gal. elevated steel tank and tower, motor-driven pumping machinery and auxiliary equipment. H. N. Roberts, 2415 Twentieth Street, Lubbock, Tex., is consulting engineer.

Cleveland, Tex., closes bids Nov. 19 for pipe for water system and other waterworks equipment; also for sewage system. Cost about $120,000. Garrett Engineering Co., Houston, Tex., is consulting engineer.

Port Arthur, Tex., plans 12-in. in Nineteenth Street for extensions in main water line to Pear Ridge district and vicinity. Cost about $31,000. M. D. Gates, Port Arthur, is consulting engineer.

Seminole, Okla., plans pipe lines for water system in Oliver district. Cost about $18,000. R. N. Geer, Seminole, is engineer.

Lake Township, Milwaukee County, Wis., closes bids Nov. 22 for distribution system costing $800,000 as first unit of new waterworks system to cost about $1,300,000, with PWA grant of $585,000. Eugene P. Dunn, 3900 South Howell Avenue, Milwaukee, is town clerk.

Brandon, Wis., closes bids Nov. 19 for waterworks and sewerage system, including elevated steel tower. Jerry Donohue Engineering Co., Sheboygan, Wis., in charge.

Preble Township, Route 2, Green Bay, Wis., has low bid from James B. Clow & Sons for 55,500 lin. ft. of 6 to 12-in. water pipe at $69,700.

Village of Reedsville, Wis., closes bids Nov. 23 for waterworks and sewerage system, including elevated steel tower. Harry A. Krueger is village clerk.

Butternut, Wis., will take bids soon for pipe lines for water system and other waterworks installation. Cost about $46,000. Burlingame, Hitchcock & Estabrook, Sexton Building, Minneapolis, Minn., are consulting engineers.

Java, S. D., plans pipe lines for water system; also elevated steel tank and tower, pumping equipment and other waterworks installation. Cost about $51,000. A. S. Mannes, 418 North First Street, Aberdeen, S. D., is consulting engineer.

San Diego, Cal., has awarded 280 tons of various sizes to United States Pipe & Foundry Co.

Portland, Ore., has awarded 400 tons of 6 and 8-in. for Powell Valley Water District line to United States Pipe & Foundry Co., San Francisco.

Bellingham, Wash., closes bids Nov. 12 for 410 tons of 24-in. cast iron or arc welded steel pipe and fittings.

Seattle, Wash., plans pipe lines in East Marginal Way for extensions in water system. Cost about $51,800. N. A. Carle, County-City Building, is engineer.

Junction City, Ore., plans pipe lines for water system and other waterworks installation. Cost about $70,000. Baer & Cunningham, Spalding Building, Portland, are consulting engineers.

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HANNIFIN *Pressure* REGULATING **VALVES**

Social Security Body May Urge Old Age Pension Plan Change

WASHINGTON, Nov. 9.—The Social Security Advisory Council, named by the Senate Finance Committee to study the Social Security Act after protests against the accumulating reserve fund (estimated to reach $47,000,000,000 in 1980) met last week and will reconvene Dec. 10. At that time it may recommend scrapping the present old age pension reserve system in favor of a pay-as-you-go plan.

Among those meeting behind carefully guarded doors in Secretary Frances Perkins' new Labor Department building were Edward R. Stettinius, Jr., chairman-elect of the United States Steel Corp.; Gerard Swope, president of General Electric Co.; Philip Murray, SWOC chairman, and Matthew Woll, AFL representative.

Amendment Considered

After the first session, Arthur J. Altmeyer, Social Security Board chairman, said the board is considering an amendment permitting workers above 65 to continue piling up old-age benefits through payroll taxes since persons now approaching that age are entitled at present to extremely small benefits when they retire. He indicated the board may favor revision to bring in seamen and other workers now excluded by the act. Mr. Altmeyer would not guess what action would be recommended regarding the tremendous reserve fund bitterly opposed by business as designed to increase the public debt and transfer it to the social security taxpayer.

Mr. Murray told the industrialists, bankers, labor leaders and college professors on the council that social security reserve funds not needed for immediate expenditures should be used in a Government-sponsored low-cost housing program which, he said, will be advanced by labor at the forthcoming Congressional session.

Stettinius Leaves

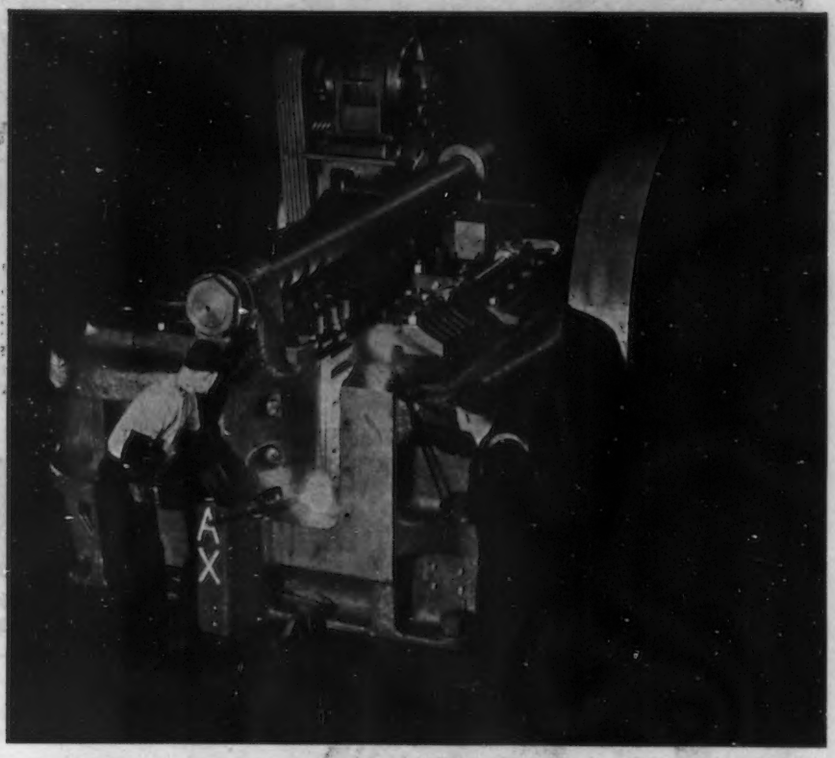
Mr. Stettinius, who left without attending the second-day conference, described problems under consideration by the council as "important."

Remaining in Washington until the conference had concluded its second meeting Gerard Swope told reporters he "hopes we have made progress, but," he smiled, "that may be only the hope that springs eternal."

Other points discussed included advisability of starting Social Security payments prior to Jan. 1, 1942, the date fixed by the present law, the minimum set for beneficiaries and the less-rapid increase of the taxes which create the benefit fund.

A subcommittee was named to confer with members of the Senate Finance Committee and the Social Security Board prior to the December meeting.

A. W. ROBERTSON, chairman of the board, Westinghouse Electric & Mfg. Co., East Pittsburgh, will discuss "The Future of Private Enterprise" on Nov. 12 at the fifth of a series of forums sponsored by the Pittsburgh Chamber of Commerce.



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AWARDS

Northampton, Mass., 510 tons, bridge, to Bethlehem Steel Co.

Boston, 500 tons, subway, to Bethlehem Steel Co., Truscon Steel Co. and a Philadelphia company.

Gloucester, Mass., 350 tons, fish pier, to Morrison-Stevens Co., Boston.

New York, 500 tons, West Side elevated highway, Canal Street section, to Concrete Steel Co., New York.

New York, 275 tons, viaduct, East 135th Street-Lincoln Avenue in Bronx, to Bethlehem Steel Co.

Queens, N. Y., 2000 tons, sewers, to Jones & Laughlin Steel Corp.

Orange County, N. Y., 270 tons, highway project, to Igoe Bros., Newark, N. J.

Bethlehem, Pa., 100 tons, dormitory, Lehigh University, to Bethlehem Steel Co.

Detroit, 800 tons, retail store, Sears, Roebuck & Co., to McCrae Steel Co., Detroit.

La Crosse, Wis., 100 tons, abutments, interstate bridge over Mississippi River, to Minneapolis Bridge Co.

Phoenix, Ariz., 139 tons, Bureau of Reclamation, to Colorado Fuel & Iron Co., Denver.

Oklahoma City, Okla., 625 tons, State office building, to Sheffield Steel Corp., Kansas City.

Knob, Cal., 1000 tons, Bureau of Reclamation, to Bethlehem Steel Co.

Calexico, Cal., 900 tons, Bureau of Reclamation, to Bethlehem Steel Co.

Galt, Cal., 158 tons, bridge, to Soule Steel Co., San Francisco.

Greenville, Cal., 356 tons, overhead crossing, to Truscon Steel Co., San Francisco.

NEW REINFORCING BAR PROJECTS

Rochester, N. H., 150 tons, high school.

Torrance, Pa., 350 tons, hospital.

Mantoloking, N. J., 200 tons, bridge.

Washington, 150 tons, men's dormitory, Howard University.

Columbus, Ohio, tonnage unstated, warehouse for Lazarus Co.

Cincinnati, 100 tons, addition to Western Hills High School.

Vermillion County, Ill., 100 tons, State highway bridge.

Manitowoc County, Wis., 125 tons, bridges; Kramp Construction Co., Berlin, Wis., general contractor.

Minneapolis, 150 tons, health building, University of Minnesota.

Stillwater, Minn., 125 tons, school.

St. Cloud, Minn., 100 tons, school.

Des Moines, Iowa, 650 tons, sewage plant.

St. Louis, 225 tons, building, Socony-Vacuum Oil Co.

Livingston, Cal., 113 tons, underpass; bids opened.

Mozee City, Wash., 1100 tons, Yakima project; bids opened.

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111 YEARS' IRON AND STEEL MAKING EXPERIENCE

"Tail Wags Dog" in Bethlehem Labor Board Hearing

By JOHN H. VAN DEVENTER

A RULING was made by Trial Examiner Frank Bloom of the National Labor Relations Board on Nov. 8 at Allentown, Pa., which is of vital interest to American employers and to American employees who are organized for collective bargaining under the Employee Representation Plan.

This ruling, which was made by the examiner in connection with the hearings of Bethlehem Steel Corp., Bethlehem Steel Co. and SWOC, unless overruled by the board or the courts, appears to set a precedent in administrative jurisprudence and to disclose a technique which Mr. Stalin might be tempted to copy.

In effect, the establishment of this precedent would appear to give to any trial examiner, and there are some 15 of them hearing cases as appointees of the board, the right to amend a complaint, on petition of the complainant at

The Defending Attorney States His Case

MR. MOORE: It is too late; the charging party or the petitioning party cannot come in here after seven weeks of hearing and undertake to prejudice our case by striking out or preventing us from going ahead with the case in accordance with the order of the Board.

We undoubtedly would have conducted our case, the defense on behalf of the respondents, in a very different manner if there had only been one case, one complaint filed, and the petition had not been filed. I do not know what might have happened. The case might have developed in a very different way. I say it is too late for the petitioner or the charging party to come in now and ask for a severance of the these cases or a continuance of one case until the other one shall have been decided.

More than that, we will have to go around the circuit twice anyway, and this means going around the circuit four times.

The case as it is is a terrible expense on the respondents. Now, double that expense, and that is what it would mean. It also means what seems to me to be in the nature of multiplicity of suits, and the expense, not only will we have the expense of going around the circuit twice, but we will have to make, to a very large extent, a duplication of records. Evidence that bears upon one case is bound to have a bearing upon the other case. If the two cases are separated in that way it will be necessary for us to put in our case as to the complaint, and then go back over the ground and not only put in evidence that might be perhaps only a part of the whole but specifically bearing upon the petitioner, but also to put in some of the other evidence which had gone in with reference to the complaint.

Now it cannot be said that you can pick out of a whole record a part of it and say that this bears upon the one case and this bears upon the other. We would never get anywhere with the case. We would be wrangling over what should and should not go in from now until the end of time.

Furthermore, if it is intended that this motion be decided by the Examiner, it is perfectly clear to me that the examiner can't have power to make a decision which in effect overrules the Board, and if a motion of this sort should be entertained at all it seems to me it must be entertained by the Board before whom we of course would be heard.

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any time during the hearings, independently of the labor board itself and in contravention of the board's original rulings. This would in turn mean that no defending attorney could prepare and present his case upon the original complaint with any assurance that he would not be compelled, in the middle of a trial, to perform a face about and completely and suddenly defend a new complaint, which would virtually destroy the value of weeks or even months of preparation.

The original complaint of the Steel Workers' Organizing Committee against the Bethlehem Steel Corp. and the Bethlehem Steel Co. was as to whether the Employee Representation Plan was company dominated and whether an election should be held to determine if SWOC should be the bargaining unit. At a meeting of the NLRB at Washington on Aug. 26, the board, represented by its head, J. Warren Madden, and Donald Wakefield Smith, ordered the two complaints consolidated for hearing, the order of the board reading as follows:

"It is hereby ordered that, pursuant to the Rules and Regulations of the National Labor Relations Board—Series 1, as amended, these cases be and are hereby consolidated for the purpose of hearing."

The hearing at Allentown, Pa., proceeded on this basis under Trial Examiner Bloom representing NLRB. Suddenly, however, on Nov. 1, after the trial had proceeded seven weeks, the SWOC, through its attorney, Anthony Wayne Smith, assistant counsel of CIO, entered a motion by mail to Examiner Bloom urging that the case be divided into two parts and that the matter of alleged company domination of Employee Representation be decided first. While unheard of as a matter of jurisprudence, this, of course, was excellent CIO strategy, since if the CIO can get the board to decide that ERP is company dominated and must be abolished, the employee representatives would automatically become disbarred from voting in an ensuing election and the field would be left open to the SWOC members for a clean sweep regardless of their numerical strength.

In spite of the fact that Mr. Smith, the CIO attorney who moved for the division of the complaint, did so by letter only and did not appear before the examiner to argue the case, and in spite of the defending attorney's plea that before any such amendment should be made he be permitted to bring it before the labor board which had made the original ruling, Examiner Bloom on Nov. 8 granted the CIO motion to amend the complaint and divide it into two parts; rejected a motion by H. A. Moore, attorney for Bethlehem, for an adjournment to enable him to appeal directly to the labor board, granted a short recess to enable the defendant's attorney to plan his new defense and ordered that the hearing proceed.

It is serious food for thought as to the ethics of administrative jurisprudence, such as is exercised by the labor board, when a defendant who has been defending a case for seven weeks is faced with a cool announcement by the examiner that the basis has been changed. Under such procedure, the respondents have no way of knowing from one day to the next what issues they are to meet. It is also a matter for serious thought as to the power of the labor board examiner to multiply the expenses to a defendant incident to going around the circuit twice instead of once. In the case of a small concern without adequate cash reserves with which to pay legal

As new developments in the production and finishing of metal parts bring to light new problems in cleaning, improved alkaline cleaning agents take the place of alkalies in crude form. Combining various kinds of cleaning energy into a uniformly dependable metal cleaner requires skill in balancing. The effectiveness of balance is quickly shown by the work of the Wyandotte group of balanced metal cleaners. Solutions are stable. Cleaning is thorough and rapid. Cleaning costs are low.

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costs, the result might well be ruinous.

There is little doubt but that this ruling will become a test case in the courts, unless it is reversed by the labor board. Certainly such power vested in the hands of appointees of a division of one Government bureau is not conducive to the business confidence which promotes prosperity.

FABRICATED STEEL

Durham, N. H., 100 tons, laboratories and service building for University of New Hampshire, to New Hampshire Structural Steel Co., Manchester, N. H.

Gloucester, Mass., 330 tons, stores and cold storage buildings on fish pier, to New England Structural Co., Everett, Mass.

Charlestown, Mass., 105 tons, boiler house, H. P. Hood & Son, to A. C. Wilson Structural Steel Co.

New York, 1160 tons, 135th Street-Lincoln Avenue viaduct, to Bethlehem Steel Co.

New York, 440 tons, alterations Queens Plaza elevator structure, to Harris Structural Steel Co., Plainfield, N. J.

Brooklyn, 660 tons, factory and garage, Circle Wire & Cable Co., to Bethlehem Steel Co.

Schoharie County, N. Y., 355 tons, highway bridge, to Harris Structural Steel Co.

State College, Pa., 430 tons, women's building, to Anthracite Bridge Co., Scranton, Pa.

Selinsgrove, Pa., 440 tons, State colony, to Fort Pitt Bridge Works Co., Pittsburgh, Pa.

Fairview, Pa., 260 tons, State hospital, to Pine Brooks Iron Works, Scranton, Pa.

Arlington, Pa., 155 tons, butylite plant, E. I. duPont de Nemours & Co., to Belmont Iron Works, Philadelphia.

Pittsburgh, 130 tons, Whittaker Paper Co. extension, to Keystone Engineering Co., Pittsburgh.

SOUTH AND SOUTHWEST

Arlington, Va., 260 tons, telephone building, to Lehigh Structural Steel Co., Allentown, Pa.

Brownfield, Tex., 130 tons, manufacturing building and boiler house, to Fort Worth Structural Steel Co., Fort Worth, Tex.

Le Flore County, Okla., 295 tons, bridge, to J. B. Kline Iron & Foundry Co., Oklahoma City.

Santa Rosa, N. M., 140 tons, Pecos River State bridge, to American Bridge Co., Pittsburgh.

CENTRAL STATES

Cleveland, 110 tons, sales and service building, Pocahontas Oil Co., to Fort Pitt Bridge Works Co., Pittsburgh.

Cincinnati, 275 tons, addition to oil process building, Procter & Gamble Co., to Bethlehem Steel Co.

Detroit, 500 tons, John R. Street grade separation, to R. C. Mahon Co., Detroit.

Detroit, 900 tons, plant addition, American Blower Corp., to Austin Co.

River Rouge, Mich., 25,000 tons, Ford Motor Co. press shop, to American Bridge Co.

River Rouge, 400 tons, high pressure boiler and turbo-generator for Ford plant; to be fabricated in owner's shop.

Grand Chain, Ill., 130 tons, Pulaski County bridge, to Hansell-Elcock Co., Chicago.

Rock Island County, Ill., 115 tons, bridge, to Midland Structural Steel Co., Cicero, Ill.

Broadview, Ill., 563 tons, grade crossing, to Bethlehem Steel Co.

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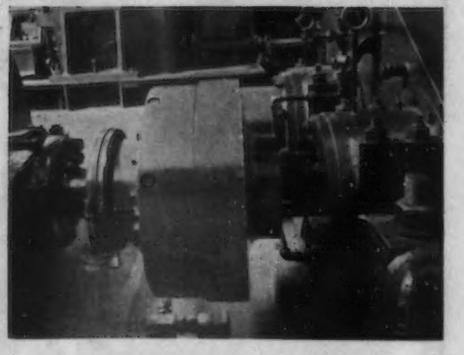
You can't take chances. Clutch failure any place in the mill means you must "blow down" for repairs. That costs money, to say nothing of scrap that always results from shutdowns. It's a Mill Type Clutch—through and through.



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Williamson County, Ill., 245 tons, highway bridge, to St. Louis Structural Steel Co., St. Louis.

Madison, Wis., 400 tons, motor plant, to Worden-Allen Co., Milwaukee.

Minneapolis, 445 tons, University Avenue bridge, to American Bridge Co.

WESTERN STATES

Natrona County, Wyo., 275 tons, three bridges, to American Bridge Co.

Long Beach, Cal., 250 tons, Procter & Gamble Co. plant, to Bethlehem Steel Co.

CANAL ZONE

Balboa, 1600 tons, superstructure for dock 15, to United States Steel Corp.; previously reported to Bethlehem Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Rochester, N. H., 300 tons, high school.

Swampscott, Mass., 100 tons, State bridge.

Providence, R. I., 300 tons, Coca-Cola Co. plant.

Greenwich, Conn., 150 tons, fire and police station.

New York, 120 tons, Bronx-Whitestone bridge; Triboro Bridge Authority, contract WB-20.

New York, 150 tons, grain storage building, John Eichler Brewing Co. in Bronx.

New York, 750 tons, apartment building, 955 Fifth Avenue.

Peekskill, N. Y., 550 tons, boiler house, Standard Brands, Inc.

Avoca, N. Y., 220 tons, Central School; bids Nov. 23.

Lackawanna, N. Y., 125 tons, school.

Alexander, N. Y., 125 tons, Central School.

State of New Jersey, 625 tons, highway bridges.

State of New Jersey, 305 tons, two bridges on route 25; bids Nov. 22.

Elizabethport, N. J., 914 tons, including 84 tons of reinforcing bars, two railroad bridges on Humbolt Avenue; Centaur Construction Co., New York, low bidder on general contract.

Jersey City, N. J., 200 tons, ramp construction.

Kearny, N. J., 140 tons, Central Avenue overpass.

Cambridge Springs, Pa., 240 tons, administration building, Polish National Alliance.

SOUTH AND SOUTHWEST

Savannah, Ga., 900 tons, lift bridge over Savannah River for Seaboard Air Line.

Mobile, Ala., 300 tons, building for National Gypsum Co.; H. K. Ferguson Co., Cleveland, contractor.

State of Oklahoma, 840 tons, highway bridges; Cleveland County, 300 tons; Noble County, 175 tons; and Okfuskee County, 365 tons.

CENTRAL STATES

Silver City, Mich., 140 tons, State bridge.

Cleveland, 300 tons, Cuyahoga Heights school.

Butler County, Ohio, 150 tons, State grade separation bridge.

Youngstown, 750 tons, blast furnace for Republic Steel Corp.

Chicago, 400 tons, club building, 34th and Emerald Streets; bids Nov. 17.

Edgerton, Wis., 600 tons, bridge No. 145; bids closed Nov. 9.

Ontonagon County, Mich., 125 tons, bridge; bids closed Nov. 10.

Wiscona, Wis., 450 tons, bridge.

North Wichita, Kan., 230 tons, Ripley station, Kansas Gas & Elctric Co.

Chase, Kan., 500 tons, oil derricks.

WESTERN STATES

Columbia Falls, Mont., 380 tons, State bridge over Flathead River.

Twin Falls, Idaho, 100 tons, school; bids opened.

FABRICATED PLATES

AWARDS

Bristol, Pa., 220 tons, 500,000-gal. elevated tank, to Chicago Bridge & Iron Works.

San Diego, Cal., 275 tons, 500,000-gal. tank and tower, to Pittsburgh-Des Moines Steel Co.

Vancouver, Wash., about 125 tons, 250,000-gal. tank, to Seattle Boiler Works, Seattle.

San Francisco, 12,500 tons, 45 82,000 bbl. tanks for Japanese interests; nine tanks to Western Pipe & Steel Co., San Francisco; 18 tanks to Bethlehem Steel Co., and 18 tanks to Chicago Bridge & Iron Works.

NEW PROJECTS

Houston, Tex., 1000 tons, tanks, Stanolind & Texas Oil Co.

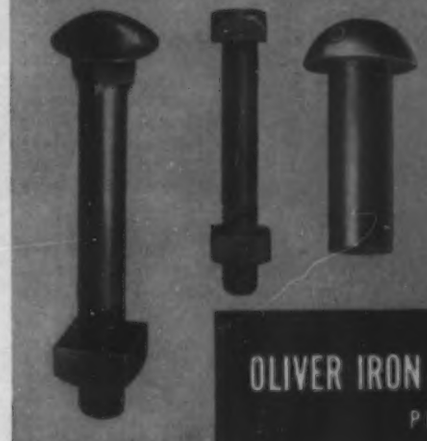
Wiota, Mont., 1159 tons, Fort Peck dam pipe line.

SHEET PILING

AWARDS

Detroit, 20,000 tons, press shop for Ford Motor Co., to Carnegie-Illinois Steel Corp.

OLIVER



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Steel Ingot Output in October Drops 21% Below September Total

STEEL ingot production, calculated on a weekly basis or in percentage of capacity employed, was the smallest last month since March, 1936. Total output of 3,392,691 gross tons was 21 per cent below the figure of 4,301,869 tons in September, while the weekly rate was down to 765,844 tons, a low point that had not been reached since March, 1936, when the weekly average was 752,563 tons. The October percentage rate was 58.31 compared with 57.40 per cent in March, last year.

Last month's total was 25 per cent below the total of 4,534,246 tons in October, 1936, which was the record month last year. The peak of monthly output this year was 5,216,666 tons in March.

During the first 10 months of 1937 ingot production totaled 45,891,460 tons, 20 per cent above the total of 38,060,388 tons produced in the corresponding period of 1936, and only 4 per cent below the total of 47,888,156 tons produced in the first 10 months of 1929.

The October percentage rate of 58.31 compares with 76.52 per cent in September and 78.15 per cent in October, 1936.

Unless business improves materially during November and December, the total output for the year will not be much, if any, above 51,000,000 tons of open-hearth and bessemer steel compared with 54,312,279 tons in the record year 1929.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which in 1936 Made 98.29 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies			
1936	Open-Hearth	Bessemer	Monthly	Weekly	Number of Weeks	Per Cent of Capacity
January	2,794,766	196,389	3,039,804	686,186	4.43	52.39
February	2,707,320	202,445	2,956,891	714,225	4.14	54.53
March	3,094,939	185,040	3,333,853	752,563	4.43	57.46
1st Quarter	8,597,025	583,874	9,330,548	717,734	13.00	54.80
April	3,565,761	304,775	3,932,605	914,593	4.29	69.99
May	3,671,375	302,092	4,037,375	911,371	4.43	69.58
June	3,578,383	334,897	3,975,569	926,706	4.29	70.75
2nd Quarter	10,815,519	941,764	11,945,549	918,182	13.01	70.10
1st 6 Months	19,412,544	1,525,638	21,276,097	817,997	26.01	62.45
July	3,526,380	326,606	3,914,370	885,604	4.42	67.61
August	3,768,135	350,560	4,184,287	944,534	4.43	72.11
September	3,782,498	303,048	4,151,388	969,950	4.28	74.05
3rd Quarter	11,077,013	980,214	12,250,045	932,981	13.13	71.23
1st 9 Months	30,489,557	2,505,852	33,526,142	856,570	39.14	65.40
October	4,144,395	317,710	4,534,246	1,023,532	4.43	78.15
November	3,925,146	329,553	4,323,025	1,007,698	4.29	76.94
December	4,048,552	305,342	4,424,367	1,000,988	4.42	76.42
4th Quarter	12,118,093	952,605	13,281,638	1,010,779	13.14	77.17
Total Year	42,607,650	3,458,457	46,807,780	895,329	52.28	68.36
1937						
January	4,357,338	291,794	4,724,939	1,066,578	4.43	81.43
February	4,012,358	331,669	4,413,832	1,103,458	4.00	84.25
March	4,730,579	403,787	5,216,666	1,177,577	4.43	89.91
1st Quarter	13,100,275	1,027,250	14,355,437	1,116,286	12.86	85.23
April	4,601,620	390,198	5,071,875	1,182,255	4.29	90.27
May	4,685,749	386,290	5,153,559	1,163,332	4.43	88.82
June	3,832,514	284,572	4,183,762	975,236	4.29	74.46
2nd Quarter	13,119,883	1,061,060	14,409,196	1,107,548	13.01	84.56
1st 6 Months	26,220,158	2,088,310	28,764,633	1,111,891	25.87	84.89
July	4,148,389	336,035	4,556,596	1,030,904	4.42	78.49
August	*4,425,255	373,428	*4,875,671	*1,100,603	4.43	*83.79
September	3,961,009	271,948	4,301,869	1,005,110	4.28	76.52
3rd Quarter	12,534,653	981,411	13,734,136	1,046,012	13.13	79.64
1st 9 Months	38,754,811	3,069,721	42,498,769	1,089,712	39.00	83.13
October	3,148,668	189,244	3,392,691	765,844	4.43	58.31

*Revised.

SAFETY WEDGE HOLDERS

Pat. Re-17846 Others Pending

SLEDGE MODEL

HAND MODEL

AXE MODEL

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M. E. CUNNINGHAM CO. 101 E. CARSON ST. PITTSBURGH, PA.

A. T. Hatch Heads Davenport Machine

DAVENPORT MACHINE TOOL CO., INC., Rochester, N. Y., has elected A. T. Hatch president and general manager to fill a vacancy caused by the death of William S. Davenport.

Secretary-treasurer of the Davenport company and assistant to Mr. Davenport since 1919, Mr. Hatch is one of a group of men trained to direct the organization's affairs.

C. R. Burt, one of the original incorporators and now president of Niles-Bement-Pond Co., will continue the post he has held for many years as chairman of the board and vice-president of Davenport Machine Tool Co. C. W. McKay, second vice-president, will continue legal adviser.

R. M. Whitney, auditor, succeeds Mr. Hatch as secretary-treasurer and two new directors, F. C. Silva and E. W. Brinkman, were elected. Edith E. Davenport resigned as director owing to ill health.

Mr. Silva, formerly with the Morse Twist Drill Co., is superintendent, while E. W. Brinkman has long been in the Davenport company's machine operating and sales engineering divisions.

German Steel Mills Have Large Backlogs

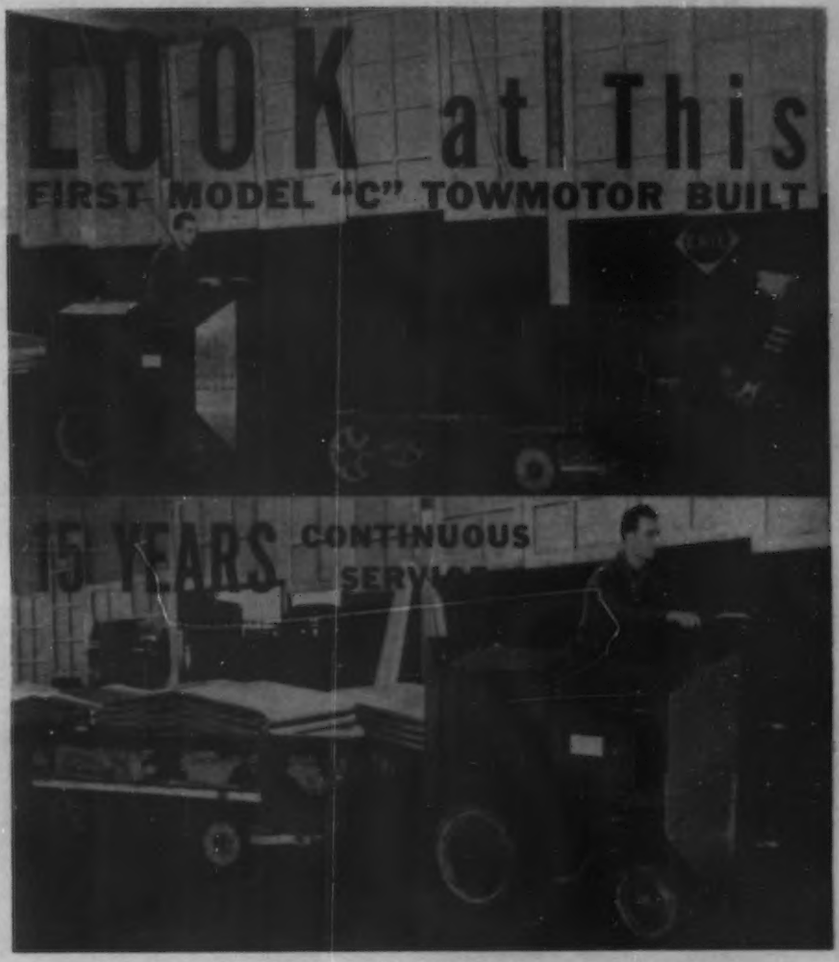
HAMBURG, GERMANY *(Special Correspondence)*. Unfilled orders of the German steel industry at the end of October are up further and are reported to be equal to about 13 weeks' operation based on current production. Finished steel output in September was 47,031 tons daily compared with 45,676 tons in August.

Production of tubing in September was 89,558 tons, of which 32,700 tons was exported; bars and joists, 501,287 tons, of which 76,338 tons was exported; hoops, 76,765 tons, of which 16,228 tons was exported; plates and sheets, 272,227 tons, of which 36,117 tons was exported; tin plate, 20,067 tons, of which 11,128 tons was exported; universal iron, 26,801 tons, of which 6128 tons was exported; rails and tie plates, 79,491 tons, of which 17,264 tons was exported.

German iron ore production in September totaled 735,069 tons, a new record for the post-war period. The September figure does not include the output of the new mines which have been under exploitation since summer by the Reichswerke Hermann Goering.

Krupps have booked an order for equipping a number of iron works in Japan and Manchukuo with smelting furnaces to utilize the Renn process. It is said that this is the largest order of its kind ever received from Japan.

International demand for pig iron is very small, but German export prices are unchanged, though nominal. There is still a heavy domestic demand here. Unfilled orders of the cartel for October showed a further gain of about 85,000 tons. The feature of the international market is that Russia, which up to the end of 1936 was a keen competitor on foundry iron, having shipped large quantities to Japan and England, had disappeared from the market up to now, but is again seeking business abroad and is quoting comparatively low prices on foundry iron.



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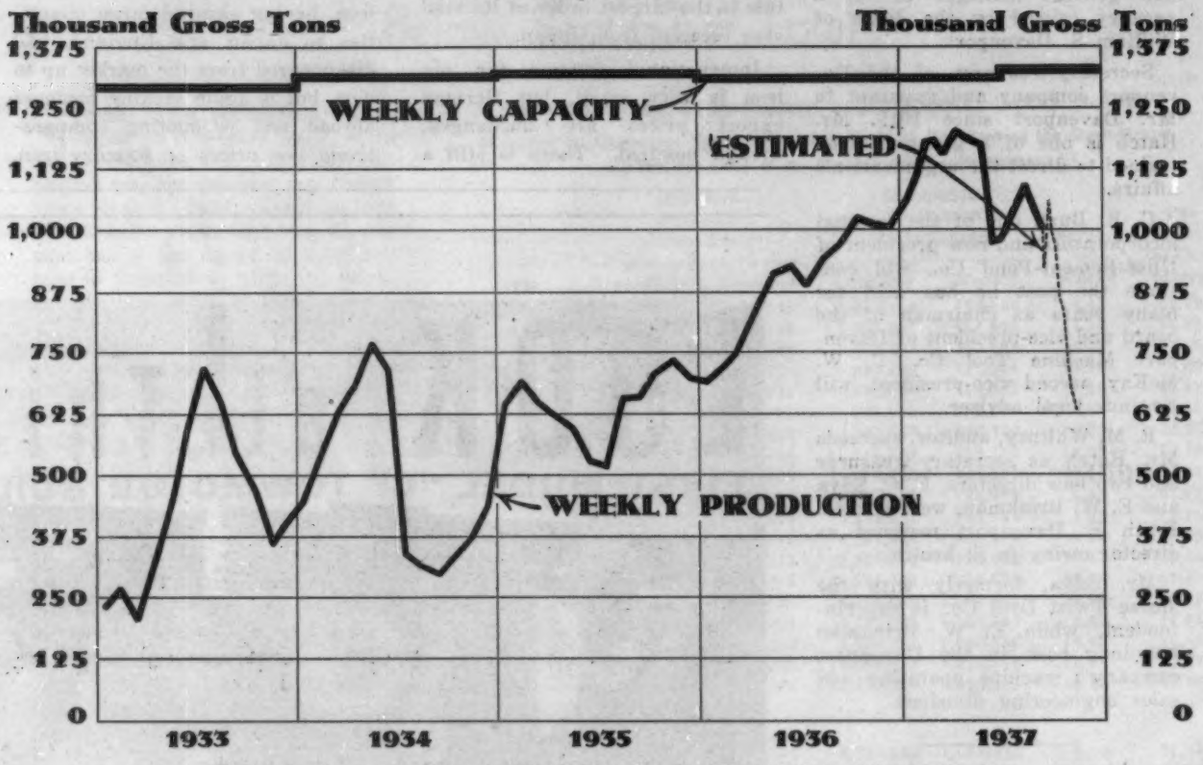
TOWMOTOR CO., 1231 East 152nd Street, Cleveland, Ohio

NEW YORK OFFICE: - 96 LIBERTY STREET - PHONE: BARCLAY 7-3090

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	34.0	42.0
Chicago	36.0	42.0
Valleys	40.0	44.0
Philadelphia	46.0	50.0
Cleveland	37.0	54.0
Buffalo	32.0	34.5
Wheeling	68.0	72.0
Southern	49.0	49.0
Ohio River	34.0	55.0
Western	45.0	65.0
St. Louis	37.0	44.5
Detroit	85.0	85.0
Eastern	50.0	62.0
Aggregate	41.0	48.0

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Nov. 9, 1937	Nov. 2, 1937	Oct. 12, 1937	Nov. 10, 1936	1937	1936
Fabricated structural steel awards	35,000	12,000	10,275	26,000	950,285	920,830
Fabricated plate awards	14,120	2,515	195	230	107,990	202,505
Steel sheet piling awards	20,000	185	0	1,825	62,615	51,975
Reinforcing bar awards	8,600	6,375	8,025	4,450	270,600	298,965
Total Lettings of Construction Steel	77,720	21,075	18,495	32,505	1,391,490	1,474,275

. . . .SUMMARY OF THE WEEK. . . .

▼ ▼ ▼

. . . Ingot production drops to 41% as orders lag.

° ° °

. . . Automotive buying still fails to come up to expectations.

° ° °

. . . Pig iron producers reaffirm present prices for first quarter.

STEEL ingot production has declined to 41 per cent, the lowest rate since July, 1935, when the month's total represented 38.86 per cent of the country's capacity, and steel scrap, at an average price of $13.50 a ton, has dropped to the lowest figure since July, 1936.

Only in a few districts is steel production holding at above the average for the country. The Pittsburgh district is down to 34 per cent, the Chicago district to 36 per cent, the Ohio Valleys, 40 per cent, the Cleveland-Lorain area, 37 per cent and Buffalo, 32 per cent. The Wheeling-Weirton district, although four points below its rate last week, is at 68 per cent, the South is holding at 49 per cent, while the Detroit plants are averaging 85 per cent. Some individual plants are entirely idle and will operate only as sufficient orders can be accumulated for economical rollings.

Further reduction of pig iron production is also in process. In the Chicago district three merchant furnaces have been withdrawn from blast.

Whether the bottom of the production decline has been reached can only be determined now from week to week on the basis of incoming business, which in the past week has fallen off generally, notwithstanding the receipt by U. S. Steel subsidiaries of orders for 25,000 tons of structural steel and 20,000 tons of bearing piles for a new press shop to be built by Ford Motor Co.

MISCELLANEOUS steel buying is in small volume as consumers and jobbers work toward the liquidation of their inventories. The failure of the automobile industry to buy in the expected volume for the manufacture of 1938 models is, however, the most surprising element in the present situation to the steel companies, which had evidently underestimated the amount of steel inventories carried over from the 1937 model season. There is still hope of an early improvement in automotive buying, based on somewhat better sales results at the Chicago automobile show than were obtained at the New York show, though this optimism is tempered somewhat by the fear of further labor troubles in the automobile industry, such as that which broke out in the Hudson plant on Tuesday. Strike votes were taken at two other plants, then rescinded. The United Auto Workers' Union will hold a strategy conference this week-end. Barring strikes, motor car production probably will swing above 100,000 cars a week as Ford gets into stride, but the Ford plants are said to be well stocked with steel from its own mills.

THE application of the railroads for higher freight rates and passenger fares, upon the successful outcome of which may depend the resumption of large-scale railroad buying, is being expedited by the Interstate Commerce Commission, which has set Nov. 29 as the date for the beginning of hearings. Meanwhile, some inquiry for rails and equipment has appeared. The Southern Pacific will buy 75,000 tons of rails for early 1938 delivery, and other roads, though not heard from yet, are expected to come into the market before the end of the year. It is doubted, however, that aggregate rail buying will equal that of 1937, which was upward of 1,000,000 tons. The Delaware, Lackawanna & Western has inquired for 500 steel hopper cars. The Burlington has ordered 11 stainless steel passenger cars. The Reading has bought 14 diesel switch engines. The South Manchurian Railways may buy from 25 to 100 steam locomotives in this country.

Aside from the Ford Motor Co. orders, lettings of steel for building projects are not large. New projects total only 10,600 tons. Three American plate fabricators share in the award of 45 tanks for Japan that will require 13,500 tons of steel.

PIG iron producers have announced first-quarter prices without change. Domestic business is dull, but merchant furnaces have ample backlogs if they were permitted to ship as originally scheduled. Export sales include 50,000 tons or more to England. Steel export sales are largely governed by the willingness of American mills to accept the prices available from abroad, which are usually lower than have recently been quoted here.

Steel ingot output in October totaled 3,392,691 gross tons, according to the American Iron and Steel Institute,. a 21 per cent drop from the 4,301,869 tons produced in September. The 10-months' total is 45,891,460 tons, only 4 per cent below the figure for the same period in 1929. The October rate of operations was 58.31 per cent.

. . . PITTSBURGH . . .

. . . Ingot production down to 34%, 68% in Wheeling-Weirton area.

o o o

. . . Demand for steel products declines; Ford Motor building takes 45,000 tons.

o o o

. . . Pig iron prices reaffirmed; steel scrap off another dollar.

PITTSBURGH, Nov. 9.—With total incoming business somewhat below the volume placed a week ago, ingot output in the Pittsburgh district has declined eight points to 34 per cent of capacity. In view of the irregularity and spottiness of new business, it is expected that steel ingot output will follow the same course. Operations in the Wheeling-Weirton district have declined four points to 68 per cent of capacity owing to lower operations at two bessemer plants.

Demand for practically all finished products has declined during the past week, although two outstanding awards which will subsequently furnish a measure of support involve 25,000 tons of structural steel and 20,000 tons of steel bearing piles for a Ford Motor Co. press shop. The orders went to American Bridge Co. and Carnegie-Illinois Steel Corp.

Bookings at some steel companies so far this month are below the volume specified during the corresponding October period. On the other hand, one or two producers are just about even with last month's sales.

Specifications from the automotive industry continue somewhat below what had been expected. There is a distinct possibility that stocks of steel in the hands of motor car makers are much larger than was generally supposed. Miscellaneous demand has shown no signs of increased activity.

Local pig iron producers have reaffirmed present prices for first quarter delivery in line with action taken elsewhere.

The scrap market continues weak with No. 1 heavy melting off $1 a ton, being quotable at $13.50 to $14.

Pig Iron

Fresh demand continues dull, with current orders being for small fill-in tonnages. Shipments are being maintained at about the same level as during the past few weeks.

Semi-Finished Steel

Aggregate demand has slipped off further in the past week and total tonnages booked are somewhat below those placed a month ago. Most non-integrated mills are fairly well supplied with stocks in view of the recession in finished steel demand.

Bars

Hot rolled bar bookings have declined somewhat and new business is spotty. Automotive tonnages are disappointing and most orders from miscellaneous customers are for fill-in needs. The proximity of inventory periods is partially responsible for the current low volume of bookings.

Cold Finished Bars

New business is about on a par with a week ago. There has been a slight gain in automotive buying but total tonnages placed are still far below what producers had expected. Miscellaneous consumers continue the practice of placing orders only where absolutely necessary.

Reinforcing Bars

Inquiries, although rather numerous, involve small tonnages. It is expected that concrete bar tonnages required for the Grand Coulee Dam, State of Washington, will be substantial. Jones & Laughlin Steel Corp., Pittsburgh, was awarded the contract for 2555 tons of concrete bars for a Queens County, N. Y., sewer project.

Plates and Shapes

Outstanding awards during the past week involve material for Ford Motor Co.'s press shop in Detroit, Mich. American Bridge will furnish 25,000 tons of fabricated material and Carnegie-Illinois Steel Corp. will supply 21,000 tons of bearing piles. These two awards are the largest placed for privately financed projects for some time. Although inquiries were quite numerous during the past week, the majority of them are for tonnages under 500 tons and the same may be said for awards. Meanwhile, structural plate and shape specifications are slightly less than a week ago.

Tubular Products

Aggregate pipe specifications are off some from a week ago, with oil-country casing being in less demand. A fair amount of current oil-country goods specifications is emanating from California, where considerable activity is taking place in the El Segunda field. Standard pipe specifications are a trifle better but current orders still suggest fairly good stocks in jobbers' hands in view of the recession in home and factory building.

Sheets

Sheet specifications declined considerably during the past week. Miscellaneous demand continues dull and the irregularity in the placing of automotive tonnages makes the sheet market exceptionally spotty.

Tin Plate

Tin plate specifications are in less volume than a week ago and operations for the industry may be estimated at 60 to 65 per cent. With seasonal factors exerting their influence and with many customers fairly well supplied, no appreciable increase in bookings is expected within the near future.

Strip

Demand for cold rolled strip continues highly irregular and spotty with large tonnages as yet not forthcoming from the automobile industry. It is the belief in some quarters that these interests have considerably more material stocked than was previously thought. For this reason it is expected that au-

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 9, 1937	Nov. 2, 1937	Oct. 12, 1937	Nov. 10, 1936
Rails, heavy, at mill	$42.50	$42.50	$42.50	$36.37½
Light rails, Pittsburgh	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	32.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	32.00
Slabs, Pittsburgh	37.00	37.00	37.00	32.00
Forging billets, P'gh	43.00	43.00	43.00	39.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	2.05
Bars, Chicago	2.50	2.50	2.50	2.10
Bars, Cleveland	2.50	2.50	2.50	2.10
Bars, New York	2.78	2.78	2.78	2.40
Plates, Pittsburgh	2.25	2.25	2.25	1.90
Plates, Chicago	2.30	2.30	2.30	1.95
Plates, New York	2.53	2.53	2.53	2.19
Structural shapes, P'gh	2.25	2.25	2.25	1.90
Structural shapes, Chicago	2.30	2.30	2.30	1.95
Structural shapes, New York	2.5025	2.5025	2.5025	2.16¼
Cold-finished bars, P'gh	2.90	2.90	2.90	2.35
Hot-rolled strips, P'gh	2.40	2.40	2.40	1.95
Cold-rolled strips, P'gh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	3.15	3.15	3.15	2.60
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.70
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.20
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.30
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	1.95
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	2.05
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	3.05
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.15
Wire nails, Pittsburgh	2.75	2.75	2.75	2.05
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.10
Plain wire, Pittsburgh	2.90	2.90	2.90	2.50
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.55
Barbed wire, galv., P'gh	3.40	3.40	3.40	2.55
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.60
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Nov. 9, 1937	Nov. 2, 1937	Oct. 12, 1937	Nov. 10, 1936
No. 2 fdy., Philadelphia	$25.76	$25.76	$25.76	$21.3132
No. 2, Valley furnace	24.00	24.00	24.00	19.50
No. 2, Southern Cin'ti	23.69	23.69	23.69	19.44
No. 2, Birmingham†	20.38	20.38	20.38	15.88
No. 2, foundry, Chicago*	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	20.8132
Basic, Valley furnace	23.50	23.50	23.50	19.00
Malleable, Chicago*	24.00	24.00	24.00	19.50
Malleable, Valley	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago	30.04	30.04	30.04	25.7528
Ferromanganese, seab'd carlots	102.50	102.50	102.50	75.00

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.
* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	*$13.75*	$14.75	$17.25	$17.25
Heavy melting steel, Phila.	*13.75*	14.75	16.75	15.25
Heavy melting steel, Ch'go	*13.00*	13.75	14.75	16.50
Carwheels, Chicago	*15.25*	16.00	17.25	16.50
Carwheels, Philadelphia	17.75	17.75	19.25	16.75
No. 1 cast, Pittsburgh	*16.75*	17.25	18.75	16.25
No. 1 cast, Philadelphia	17.75	17.75	19.25	16.75
No. 1 cast, Ch'go (net ton)	*11.50*	12.25	13.50	14.00
No. 1 RR. wrot., Phila.	17.75	17.75	19.75	15.75
No. 1 RR. wrot., Ch'go (net)	*11.25*	12.00	12.75	14.25

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.25	$4.25	$4.25	$3.75
Foundry coke, prompt	5.00	5.00	5.00	4.25

Metals

Per Lb. to Large Buyers:	Cents	Nov. 1 1937 Cents	Cents	Cents
Electrolytic copper, Conn.	*11.00*	11.75	12.00	10.50
Lake copper, New York	12.125	12.125	13.125	10.62½
Tin (Straits), New York	*53.00*	47.75	54.00	54.00
Zinc, East St. Louis	5.75	5.75	6.25	4.95
Zinc, New York	6.10	6.10	6.60	5.32½
Lead, St. Louis	*4.85*	5.35	5.85	4.95
Lead, New York	*5.00*	5.50	6.00	5.10
Antimony (Asiatic), N. Y.	*16.50*	17.25	18.50	12.50

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Nov. 9, 1937	2.605c. a Lb.	$23.25 a Gross Ton	$13.50 a Gross Ton
One week ago	2.605c.	23.25	14.42
One month ago	2.605c.	23.25	16.25
One year ago	2.197c.	18.73	16.33
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1937	2.605c., Mar. 9	2.330c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	$21.92, Mar. 30	$13.50, Nov. 9
1936	2.330c., Dec. 28	2.084c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., Apr. 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., Apr. 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., Apr. 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

tomotive business will be much smaller than had been anticipated. Meanwhile, miscellaneous demand involves small tonnages for immediate delivery.

Wire Products

Of interest to fence manufacturers is the inquiry for 150 miles of industrial fence for the Colorado River aqueduct being constructed under the direction of the Metropolitan Water District, Los Angeles. Approximately 4000 tons of steel will be required, involving approximately 1500 tons of posts, 1400 tons of fence and 1100 tons of miscellaneous fixtures. Bids will close Nov. 15. Manufacturers' wire demand shows little change from a week ago and jobber business if anything is slightly better.

Railroad Buying

It is the general opinion in this district that substantial railroad equipment orders will not be forthcoming until after the carriers' present request for higher freight rates is settled. Meanwhile, the Delaware, Lackawanna & Western is inquiring for 500 50-ton hopper cars and it is expected that New York Central will shortly issue an inquiry for 500 50-ton box cars.

... *Steel buying smaller; operations again decline.*

CINCINNATI, Nov. 9.—Reflecting the general decline in steel demand, district sheet steel business eased a trifle the past week to about 55 per cent of capacity. Automotive ordering is definitely disappointing. The miscellaneous demand has become very spotty. Consumer interest is turning markedly conservative and prospects of an early change in demand are lacking. Mill operations are being brought within the conservative limits of demand and average production does not exceed 50 per cent of calculated capacity. One or two units are slightly above the average.

Ingot steel production dropped sharply the past week, and the lower rate of operation is set for this week. The leading district producer moved to reduce steel inventory to meet the present slump in steel demand. Two district units are without any open hearths in operation.

A slight improvement in pig iron specifications was attributed to consumer desire to take iron before new freight rates become effective. Tonnage, however, is not encouraging and new business shows no tendency to change from present spot orders for urgent needs. The melt is apparently unchanged at about half the foundry capacity, with machine tool melters still supporting a substantial portion of market activity.

... *Domestic steel prices for 1938 to be unchanged.*

LONDON, Nov. 9. (By Cable).—With the approval of the Import Duties Advisory Committee, steel prices for home trade have been fixed for all of 1938 at unchanged levels. On orders which cannot be shipped until after the end of 1938 the price in effect at time of shipment will apply.

New iron and steel business is still quiet, but producers are active on current orders and the pressure for deliveries is unrelaxed.

The home price of Cleveland foundry forge iron has been raised 5s., but a loyalty rebate of 5s. was granted users undertaking to purchase only English iron, hence the price is virtually unchanged. Considerable quantities of United States and Canadian basic pig iron are still arriving.

The supply of semi-finished steel is better, but re-rollers are still wanting more to insure regular operations. Heavy steel demand is unrelaxed. Works are busy, quoting six months delivery on new orders.

Continental steel export demand is negligible except from the Argentine. Works so far are not affected as they are busy with current contracts. Branch committees of the raw steel cartel meet in Paris on Nov. 22.

Tin plate is dull on the continued weakness of tin and prices are now nearing the official minimum. Unfilled orders are about 4,500,000 base boxes.

Black and galvanized sheets are quiet.

... *Japan buys 45 tanks, taking 13,500 tons of plates.*

o o o

... *Southern Pacific rail inquiry for 75,000 tons.*

SAN FRANCISCO, Nov. 8.—Japanese interests have made awards on 45 82,000-bbl. tanks, involving 13,500 tons of plates, as follows: Nine tanks to Western Pipe & Steel Co., San Francisco; 18 tanks to Bethlehem Steel Co., and 18 tanks to Chicago Bridge & Iron Works, through Eastern offices.

Water tanks at San Diego, Cal. and Vancouver, Wash., totaling 400 tons, were the only other plate awards as that field slipped into the lull that has enveloped other divisions of the industry for the past two months.

Only in cast iron pipe was activity near normal. Two awards were made, involving 680 tons, and two others, totaling 1125 tons, are expected in the next fortnight. The United States Pipe & Foundry Co., San Francisco, received both awards.

The Southern Pacific Co. had issued an inquiry at New York for 75,000 tons heavy steel rails. Hope that the Western Pacific Railroad trustees would receive court permission to spend $5,100,000 to finance improvements early in 1938 was shaken by rumors that security holders would raise objections.

The U. S. Engineer's Office, Portland, Ore., has called for bids Nov. 18 for construction of a jetty at Ilwaco, Wash., involving 700 tons of rails.

Only one new Bureau of Reclamation project was reported. Bids were opened for 1100 tons reinforcing bars for use at Moxee City, Wash., on the Yakima project.

A $50,000,000 bond issue for the construction of a subway was defeated by San Francisco voters last week. Bonds for $2,850,000 to finance construction of a seaplane base carried; a sizable tonnage of steel is believed to be involved.

. . . . CHICAGO . . . .

. . . Ingot production down to 36%; Merchant furnaces out of blast.

o o o

. . . Chicago automobile show has good results; car makers buying slowly.

o o o

. . . Pig iron prices reaffirmed; steel scrap off 75c. a ton.

CHICAGO, Nov. 9.—With automobile assemblies still lagging, no signs of important railroad buying in the near future, and a further slowing down in general mill activity, production of steel ingots slides sharply downward again this week to 36 per cent of capacity, a loss of six points from last week. Another blast furnace was blown out at Gary, leaving five in blast, while a stack was added to those operating at South works, making a total of four in blast there. Of the district mills, three maintained last week's rate of output, but the two largest operators reported reductions.

A great deal of interest is being centered on the automobile show here this week, the showing in Chicago lately having surpassed the New York exhibition in importance, since it is believed that the true buying sentiment of the country may be sounded out more accurately from this central position. Attendance is slightly in excess of that recorded at last year's show, and sales are said to be about even, with gains reported in some instances.

Specifications to local mills from the automobile industry have not increased sufficiently, however, to be reflected in higher operations and, with car manufacturers apparently holding down production to actual orlers, as was evidenced by last week's assemblies showing a decrease from the previous week, it may be some time before a large volume of orders emanates from that source.

General business being received in this district is unimpressive, one of the best orders lately being that for several thousand tons of plates for Japanese tanks placed with Chicago Bridge & Iron Works. Inventories are still being worked down, thus assuring mills of a substantial market when continued or increased business causes replenishment of stocks. Jobbers in Iowa, though not particularly active at the moment, are optimistic because the influx of corn money is expected to bolster business considerably. In St. Paul, steel warehousemen are finding times dull but are confident of a definite upswing later in the fall.

Scrap prices are down 75c. this week, melting steel being quoted at $12.75 to $13.25.

Pig Iron

First quarter books have been opened at prevailing prices. November shipments of pig iron will be 15 per cent off from October and December will continue this trend, according to estimates here. An upward movement is expected during January, which should extend into spring. Foundry coke shipments will maintain the present rate through November and December and then show an increase during the first quarter of 1938. Shipments still appear to be less than the melt, which indicates further inventory reduction. Another month or so, according to sellers, should see stocks running low. In the past week, merchant stacks at Zenith, Federal and Iroquois plants were taken from blast. Of these, the Zenith and Federal stacks were banked, while that at Iroquois was blown out.

Plates and Shapes

Orders for plates are practically non-existent, deliveries are prompt, and inquiries are scarce. No railroad interest has been reported. Some tanks for Japan, which will require several thousand tons of plates, to be fabricated by Chicago Bridge & Iron Co., are about the only recent activity to be noticed here. An Illinois highway job gave 563 tons of shapes to Bethlehem, while a similar project in Minnesota taking 455 tons went to American Bridge Co. Worden-Allen took a 400-ton building in Madison, Wis. Inquiries that involve more than 100 tons each are negligible.

Wire and Wire Products

With automobile specifications still lagging, and the farmers not yet started on their farm repair programs, wire sales continue at a mediocre rate. Sellers do not expect to see an upward trend until the last of this month at least. Demand from the farm implement industry is steady.

Sheets

Pessimistic reports circulated concerning the response to the New York automobile show. Motor car and steel producers are anxiously attempting to determine the reaction of the public to the Chicago show now in progress. The fact that assemblies last week actually showed a decrease when compared with the previous week illustrates how closely motor car makers are gearing their production to demand and is, at the same time, an enlightening commentary on that demand itself. The prospects of substantially increased orders from Detroit are none too bright, according to district sheet mills. Deliveries continue to range from one to three weeks.

Reinforcing Steel

Awards and inquiries involving more than 100 tons of bars are extremely few. There are some private jobs up for consideration but most of the projects are parts of State highway programs.

. . . BOSTON . . .

. . . Pig iron business extremely dull.

BOSTON, Nov. 9.—Little, if any, improvement is reported in the pig iron market. What iron is moved is in small lots to complete orders for castings, sales running as small as truck lots. Unless busi-

ness improves, the Mystic Iron Works in all probability will blow out its furnace Dec. 1. Foundry operations have begun to slip again, and foreign interest in iron has evaporated, consequently the chances of a pickup look rather slim at the moment. Indications are that prices will be reaffirmed for first quarter. The advance in freight rates will not have a bearing on the cost of foundry coke to most New England consumers because current rates are based on truck and water competition.

South Manchuria Railway is inquiring for 25 to 100 locomotives.

Burlington has ordered 11 light weight stainless steel passenger cars from E. G. Budd Mfg. Co., Philadelphia.

Reading Co. has ordered eight diesel switch engines, two from American Locomotive Co. and six from Electro-Motive Corp., La Grange, Ill.

Delaware, Lackawanna & Western is inquiring for 500 50-ton hopper cars.

RAILS AND TRACK SUPPLIES

Southern Pacific is inquiring for 75,000 tons of rails.

United States Engineers Office, Portland, Ore., closes bids Nov. 18 on 700 tons of rails for construction at Ilwaco, Wash.

Utilities Pipe Line Co., Mount Pleasant, Mich., now being organized as a subsidiary of Gas Corporation of Michigan, same place, plans new welded steel pipe line from gas field near Mount Pleasant operated by Consumers Power Co., Jackson, Mich., to Mount Pleasant city limits, about 13 miles. Local distribution will be carried out by parent company.

Bay Pipe Line Corp. and Bay Refinery Corp., 205 Bearinger Building, Saginaw, Mich., have been chartered, each with capital of $250,000, to carry out welded steel pipe line project from Buckeye Township oil field, Gladwin County, Mich., to Bay City, Mich., about 33 miles, referred to in these columns last week. New organizations will be affiliated with Gordon Oil Co., Hersee Building, Mount Pleasant, Mich. James C. Graves, Saginaw, is one of heads of companies.

Pittsfield, Ill., plans welded steel pipe line from city limits to connection with pipe line system for natural gas transmission to municipality, and steel pipe line distribution system. Cost about $100,000. Financing has been arranged through Federal aid.

Quartermaster, Chanute Field, Rantoul, Ill., asks bids until Nov. 15 for welded steel pipe; also for malleable iron bushings, expansion joints, pipe caps and other fittings (Proposal 196-28).

Standard Oil Co., Midland Bank Building, Cleveland, plans welded steel pipe in several city streets and through city park at Canton, Ohio, for gasoline transmission to local bulk distributing plant.

United States Engineer Office, Fort Peck, Mont., asks bids until Nov. 15 for 1500 lin. ft. of 6-in. welded steel pipe (Circular 141).

Goldendale, Wash., will take bids soon for 6-in. steel pipe for main water lines.

Toledo, Ore., closes bids Nov. 18 on 170 tons of 10-in. for waterworks improvement.

Union Oil Co. of California, Union Oil Building, Los Angeles, has let contract to Pacific Crane & Rigging, Inc., 6800 South Alameda Street, for about 15,000 ft. of 8-in. welded steel pipe line in Caspian, Wardlow, Hill, Delta and Nadeau Avenues, Long Beach, including material and labor.

. . . *Hand-to-mouth buying characterizes market.*

ST. LOUIS, Nov. 9.—The market for finished steel continues quiet. Orders are confined mostly to material required for some specific job, and there is virtually no forward buying. Consumers say they will withhold buying until they have completed inventories. Warehouse business for October was estimated to be between 10 and 15 per cent below September, and November has started out at about the same rate as October. Structural fabricators in the district are complaining of lack of new business and a dwindling backlog file.

A falling off of the melt of pig iron in the St. Louis area is reported from all groups, with the exception of agricultural equipment, which continues at peak production. Open-hearth ingot production is down to 35 per cent of capacity. The stove foundries have substantially reduced their rate of operations, some of them closing until after the turn of the year, when new patterns will be ready. The curtailment of operations began about two weeks earlier than usual. There was very little new business in pig iron during the week.

Electric Hose & Rubber Co., Wilmington, Del., has opened an enlarged Eastern sales office at 9 Rockefeller Plaza, New York, to serve as headquarters for A. B. Dougall, general sales manager, and D. C. Smalley, manager of the metropolitan sales division.

. . . *Dominion mills still operating at high rate.*

TORONTO, Nov. 9.—Moderate improvement in spot sales featured business in the Canadian iron and steel markets in the past week. Canadian mills continue at capacity rates in some departments and backlogs are sustained. Export demand for iron and steel continues, and substantial shipments have been made recently to Great Britain. Airplane plants in Canada recently have booked large contracts and others are pending. Demand for sheets is showing improvement and Canadian mills are quoting delivery for late December.

While no sheets are coming into Canada from Great Britain, Canadian consumers have been importing fairly extensively from the United States, with September black sheet imports reported at 7010 tons, while imports of structural steel from across the international boundary amounted to more than 5000 tons for the same month. On the other hand, Canada has been exporting pig iron to Great Britain and scrap to Japan, the latter going forward from Vancouver.

Officials of the Steel Co. of Canada, Ltd., Hamilton, Ont., report that the company is holding steel ingot production at capacity. They state that the backlog of unfilled orders has been sustained in some lines while others are lower. It is believed that present high operation rates will continue to the end of this year. Officials also state that the new soaking pits at Hamilton have been placed in operation and work on the new blooming mill is expected to be completed next March.

Demand for merchant pig iron continues with little change. Difficulty in obtaining cast scrap still is a factor toward greater pig iron consumption in Ontario. Local blast furnace representatives look for continuation of good demand for iron into 1938.

In the iron and steel scrap markets there has been minor decline in shipments of steel scrap to the mills in the past few weeks owing to heavy purchases by the big consumers from the railroads.

. . . CLEVELAND . . .

. . . Ingot output drops to 37% in Cleveland-Lorain area.

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. . . Consumers' stocks not being depleted as rapidly as expected.

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. . . Pig iron producers announce unchanged prices for first quarter.

CLEVELAND, Nov. 9.—Ingot output in the Cleveland-Lorain district dropped 17 points to 37 per cent of capacity this week, the sharp decline being largely due to the shutting down of the Riverside works of the Otis Steel Co. which had been operating four out of eight open hearths. In the Youngstown district output declined four points to 40 per cent of capacity. The National Tube Co. has blown out a blast furnace in Lorain.

Some of the steel plants have accumulated large stocks of semi-finished steel so that an improvement in steel business is not likely to be immediately reflected in a corresponding increase in ingot output.

Finished steel demand shows virtually no change from the previous two or three weeks. The volume continues very light and orders are for small lots from widely diversified industries. Consumers are buying only for immediate needs. Sales offices look for some upward trend in orders as consumers stocks become further reduced. However, these stocks are not being depleted as fast as had been expected because most consuming plants are operating at a lower rate than a few months ago.

Structural shapes are moving better than other steel products although pipe continues in fair demand. While no large building projects are being placed, a good amount of small private work continues to come out, few jobs taking as much as 100 tons of steel.

Orders for bars, sheets and strip from the motor car industry continue light, no purchases in sizable lots having been made in the past two weeks or more. No railroad buying of any importance is expected in this territory during the remainder of the year.

Leading pig iron producers have reaffirmed present prices on Northern and Southern grades for the first quarter. This action had been expected.

Scrap prices have again declined and the market is in a badly unsettled condition with no purchases by consumers. Present quotations are based on what dealers are paying producers, who are anxious to move their scrap and are letting it go at the best prices they can get.

Bars, Plates and Shapes

Little bar tonnage is coming from automobile plants and parts makers and miscellaneous orders are confined to small lots for filling in stocks. Agricultural implement manufacturers are buying from hand to mouth. Demand for small lots of structural shapes for private construction work continues good and local fabricating shops are keeping busy. The Ohio State Highway Department today took bids for three bridges in Adams and Knox counties requiring 600 tons of structural shapes. Considerable work in building schoolhouses will come out shortly, a number of Ohio municipalities having voted bond issues for that purpose at the recent election. These will require small tonnages of steel both in fabricated shapes and reinforcing bars. Plates are very quiet.

Pig Iron

Present prices on pig iron have been reaffirmed for the first quarter by Cleveland, Youngstown, Toledo, Erie, Detroit, Buffalo and Birmingham furnaces. Current prices on Ohio silvery iron and Bessemer ferro-silicon have also been reestablished for the coming quarter. Extension of present prices had been generally expected since the announcement of reestablishment of steel prices for the first quarter. Naming of prices is not expected to be followed by any buying for the first quarter, as consumers at present are covering only for immediate needs and sales are confined to small lots. Shipments so far this month show little change from the corresponding period in October. That consumers continue to reduce their stock piles is indicated by shipments, which apparently are running behind consumption.

Sheets and Strip

There was little change in the volume of sheet business the past week. No sizable orders came from either the motor car industry or other consumers. Some orders for hot rolled sheets were placed by grave vault manufacturers who are starting their season's production. Most consumers still have fair stocks and, as they have reduced operations, they are not using up these stocks as rapidly as they otherwise would. Several refrigerator manufacturers are operating fairly well but still have considerable steel in stock. One local stamping plant has received releases of shipments to start Nov. 15 for stampings for Chevrolet cars. Little strip tonnage is moving. Leading automobile parts makers are taking rather limited shipments against outstanding orders.

. . . . BUFFALO. . . .

. . . Pig iron prices reaffirmed for first quarter.

BUFFALO, Nov. 9.—Pig iron producers here have reaffirmed present prices for first quarter delivery. Shipments of iron in October were slightly better than during September.

Slowing down of open-hearth operation brought about a blast furnace reduction at Bethlehem's Lackawanna plant, which now has four blowing instead of five. Active open hearths at the same plant last week were reduced to five, then increased to eight. Republic has resumed operation of five open hearths which had been idle during blooming mill repairs. Bethlehem's

big strip mill is not in operation at this time, though it was expected to resume some time during the week.

Swartout & Rowley, Rochester, were awarded the general contract for the Canaseraga central school. An Avoca school will require 220 tons of structural, according to unofficial estimates. Bids will go in soon on a Lackawanna school and an Alexander, N. Y., school, each to require 125 tons of structural.

Soviet, English Companies Place Equipment Orders With United

A GROUP of mill equipment orders from foreign and domestic sources was announced this week by United Engineering & Foundry Co., Pittsburgh.

United received from Machinoimport, of U.S.S.R., a contract to supply a complete 112-in. hot and cold four-high reversing mill, a 66-in. complete four-high cold reversing mill, a 112-in. and a 66-in. planishing mill with auxiliary equipment, and a complete finishing department including cleaning, shearing, leveling and processing equipment, all to be shipped within a year.

United also closed with Youngstown Sheet & Tube Co., Youngstown, for a new high speed two stand four-high 42-in. wide tandem skin pass mill for cold reduced tin plate in coil form, and an electrolytic cleaning line for processing this material. The equipment will be installed in the Indiana Harbor, Ind., plant of Youngstown Sheet & Tube.

Through H. A. Brassert & Co., consulting engineers of London and Chicago, United Engineering received orders for two four-high reversing cold mills and three two-high skin pass mills from Stewart's & Lloyds division of Lancashire Steel Corp., Corby, England.

Through its Canadian associates, Dominion Engineering Co., Ltd., United Engineering sold a new rotary coil pickler to Dominion Foundries & Steel, Ltd., Hamilton, Ont.

United's associated English company, Davy & United Engineering Co., Ltd., has sold two of the largest heavy forging presses ever manufactured.

During the past three years United Engineering & Foundry has been awarded contracts by foreign countries aggregating in excess of $15,000,000.

Roosevelt May Purge Coal Board Following Hosford's Resignation

WASHINGTON, Nov. 9.—Bitter dissension within the National Bituminous Coal Commission, which has delayed the Government's coal-price fixing program since August and precipitated the resignation of Chairman Charles F. Hosford, may lead to a thorough house-cleaning by the President before the coal stabilizing body is finally in condition to administer the coal act.

Following Mr. Hosford's resignation, the entire seven-man board was called on the White House carpet, an unprecedented procedure, and spent half an hour with the President. Commission members were silent when they emerged from the White House but there were reports that Mr. Roosevelt may ask for further resignations, reappointing members he feels could work in harmony.

Crux of the commission's difficulties is patronage disputes which reportedly has split the agency into two fighting camps, relegating more important problems to the background.

Price Dates Vary

Latest reports of the probable price-fixing date vary from Dec. 15 to Feb. 1. And the status of captive coal under the act is still undetermined. Despite the fact applications seeking exemption from the act have been pending for weeks, the commission has ruled on only one application, that of the Wheeling Steel Corp.

Confirming reports of his resignation, Mr. Hosford, former Pittsburgh coal operator and Harvard law graduate, denied his action was prompted by internal disorders in commission ranks.

"The two years I have spent in Washington have involved a greater financial sacrifice than I can continue to make and personal circumstances alone impelled me to tender my resignation," he said.

Hosford, who friends say has been an ardent Democrat since 1932 and a close personal friend of Senator Joseph F. Guffey of Pennsylvania, has been at the point of resigning for several months, according to reports, and has been known to have been dissatisfied with conditions within the commission almost since he joined the commission two years ago.

Meanwhile, commission attaches have moved to patch up differences by holding a "love feast" to bolster morale of employees. Personnel conditions within the agency have been described as "intolerable."

First Ore Carrier in Seven Years Launched

CLEVELAND, Nov. 9.—The first ore freighter to be launched on the Great Lakes in seven years will slide down the ways tomorrow as the Pittsburgh Steamship Co.'s new vessel, the *William A. Irvin*, is christened at the Lorain, Ohio, yards of the American Shipbuilding Co.

One of four ore vessels to be launched this year by the United States Steel Corp. subsidiary, the *William A. Irvin* is 610 ft. 9 in. long and 60 ft. wide. Draft of the vessel is designed for a maximum of 22 ft. and displacement is 18,780 tons. Shaft horsepower is 2000 at 90 r.p.m. and 2300 at 99 r.p.m.

Construction details show the hull is built with longitudinal framing for the deck, bottom and tank top (a new method). Side tanks extend to the free board deck instead of to the main deck stringer, a feature adding longitudinal strength and providing an enclosed passage, port and starboard from one end of the ship to the other.

Electric welding is used extensively in the hull with tank top and side tanks, including stiffeners, completely welded, partly to eliminate leaky rivet holes. Certain parts of the decks, hatches and deckhouses, the stack, skylight and many other parts also are welded.

The vessel's stern frame is built stream-line of cast steel in three sections with lines of the hull faired into the stern frame. It has 18 cargo hatches, with solid covers which will be lifted by a gantry crane moving on tracks placed the full length of the cargo deck.

. . . . NEW YORK. . . .

. . . Southern Pacific inquires for 75,000 tons of rails.

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. . . D. L. & W. in market for 500 hopper cars.

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. . . Steel buying generally shows no improvement.

NEW YORK, Nov. 9.—The Southern Pacific Co. has issued an inquiry at its executive offices, 165 Broadway, New York, for 75,000 tons of rails for delivery during the early part of 1938. This amount is considerably larger than the purchases made by this road in any recent year. Other rail inquiries are expected between now and the end of the year, but the total amount of rail buying for delivery in 1938 probably will be smaller than the 1937 total. In the first nine months of this year, according to American Iron and Steel Institute figures, production of rails of 60 lb. and heavier totaled 1,105,227 gross tons.

Railroad buying in general is scraping bottom, but some inquiries are appearing that promise a better volume of business than has prevailed in recent weeks. The Delaware, Lackawanna & Western is inquiring for 500 50-ton hopper cars and the New York Central is expected to inquire for 500 50-ton box cars. Foreign inquiries include 25 to 100 locomotives for the South Manchurian Railways and six locomotives for the Chilean State Railways. Domestic locomotive inquiries include eight steam and two diesel-electric. No locomotives were ordered in October and only 21 freight cars.

Hand-to-mouth buying still prevails among all classes of buyers. While consumption of steel has declined in many lines, it is believed by most steel people that inventories are being reduced and that replenishment buying will eventually make itself felt, but it is doubted that much change will come until after inventory periods. One New York sales office has had a very satisfactory improvement in orders for sheets, though individual lots are seldom more than a carload to 100 tons. Plate manufacturers are looking to the railroads to pull them out of the slough. Needed repairs, it is believed, may force some purchases within the next month or two.

Pig Iron

Hanna Furnace Corp. and Chateaugay Ore & Iron Co. have reestablished current prices for first quarter business, the Chateaugay announcement covering its low phosphorous iron. These announcements, which were in line with expectations, are expected to encourage buying by consumers that have been delaying purchases pending clarification of the price trend in the coming quarter. New business continues light, limited mainly to carlots for prompt delivery. Melting activity is slackening substantially and this reduction in operating rates is being reflected in a gradual decrease in the volume of shipments against old contracts. The export market was brightened considerably by the recent purchases of 50,000 to 60,000 tons of iron for England and several smaller lots, ranging from 3000 to 5000 tons, for Continental Europe. Other foreign proposals currently circulating cover only small lots. Under pressure of domestic producers claiming that specifications in the recent Navy Department inquiry on ferromanganese and manganese ore were discriminatory, the department has rejected the bids opened on Oct. 29 and is expected to issue a new inquiry shortly that will permit domestic producers to qualify.

Wire

There is a fair volume of miscellaneous business from the smaller manufacturers who are buying for current requirements in small lots. Some of the larger users of wire who bought heavily in the spring are down to rock bottom on stocks and are placing fill-in orders. A sudden upsurge in business would leave many of them short of material. The hardware trade is behind in ordering for their spring requirements on such goods as wire netting and mesh on which prices were recently announced. Prices on most wire products are holding firm.

Wheeling Steel Asks Rehearing

WASHINGTON, Nov. 9.—Wheeling Steel Corp. has petitioned the National Bituminous Coal Commission for a rehearing on the commission's recent decision denying exemption from the captive mine clause of the Coal Act to the Consumers Mining Co. and the Emperor Coal Co., subsidiaries.

The company based its request for rehearing on the ground that it did not have opportunity to examine the original report of the examiner and that the findings of fact are incomplete.

In general terms the question is whether coal produced by one corporation and consumed by another is entitled to exemption. The commission ruled that the Beech Bottom, W. Va., mine of the steel company is a "captive mine," and granted it exemption from the act. The application with regard to the Consumers and the Emperor Mines was denied.

Hudson Motor Down for Day

DETROIT, Nov. 9.—Eleven thousand men were out of work today when the main plant of the Hudson Motor Car Co. was closed by the management after a protest meeting in the paint department over the discharge of eight UAW members. Reduction in production schedules caused the layoff, the company said. The plant will reopen Wednesday.

HARRY W. SCHUETZ has been appointed general manager of the Calona division (manufacturer of pipe-thread protectors for oil-country goods), of the Pittsburgh Screw & Bolt Corp., Pittsburgh, succeeding WALTER A. CLARKE, who died Oct. 24. Mr. Schuetz has been associated with the company for a considerable number of years. He will continue his field work in the petroleum industry and contact pipe mills along with his new duties.

. . PHILADELPHIA . .

. . . District's operating rate down four points to 46 per cent.

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. . . Large Navy tonnage pending.

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. . . Buying market completely listless.

PHILADELPHIA, Nov. 9.—With the year-end holiday and inventory periods in the offing, practically every district user is more anxious than ever to work off what inventory he now has and hold off buying action until the trend of business in January is more predictable. The result of this inactivity is an additional contraction of mill backlogs, which is resulting either in actual removal of open hearths or the stocking of semi-finished steel. Several refining units have gone off during the week, dropping the eastern Pennsylvania operating rate down four points to 46 per cent of capacity. Other producers in this area are preferring to get the full life from their furnaces and are thereby necessarily stocking steel.

Mill prices on every important type of steel continue to hold very firm, and there is no expectation that quotations will weaken over the remainder of this year.

Pig Iron

Most district users continue to work from stock piles and are only coming into the market for occasional fill-in lots.

Shapes and Plates

The largest tonnage in sight over the next fortnight is the 44,000 tons of bars, plates and shapes for the battleships North Carolina and Washington, on which the Navy Department is taking bids. These ships will be built at Philadelphia and Brooklyn. Shapes awards during the week involved 420 tons for a women's building at State College, Pa., to Anthracite Bridge Co.; a 250-ton hospital at Fairview, Pa., to Pine Brook Iron Works; and 140 tons for a du Pont building at Arlington, N. J., to Belmont Iron Works. Plain and fabricated plate is in very poor demand, the only award of the week being 200 tons for a tank at Bristol, Pa., to Chicago Bridge & Iron Co. Although railroads were pleased to get some increase in freight rates, they are still as unrelenting as ever in their determination not to take on any more new steel orders in the near future. Reinforcing bars are hardly moving at all, and prices on the few active tonnages are none too encouraging.

Sheets and Strip

Many users here are still comparatively overstocked as the direct result of the extended delivery position of mills of several months ago. Consumption here has not undergone any large reduction, however, and it is quite likely that these inventories will be pretty well liquidated by the end of the year. Demands from local auto body and auto frame plants has not lifted to the extent previously expected, and turnover in stove, tank and miscellaneous manufacturing plants has eased off to a moderate degree. Due to poor packs in this area, can makers have had to curtail operations, the result being an accumulation of tin plate already on order and a complete cessation of new buying. No change in the current inaction in sheets, strip and tin plate is expected until early January.

Imports

The following iron and steel imports were received here during the past week: 7750 tons of chrome ore from French Oceania; 99 tons of sponge iron, 61 tons of steel tubes, 23 tons of steel forgings and 44 tons of steel bars from Sweden.

. . BIRMINGHAM . .

. . . Steel operations and shipments believed to be at low point.

BIRMINGHAM, Nov. 9.—Local steel officials feel that operations and shipments have reached their lowest point. They may remain stationary for a short period and then improve gradually. This opinion is based on inquiries and prospective business now in sight. Tennessee Coal, Iron & Railroad Co. is now operating about 65 per cent as compared with 70 per cent and above some time ago.

Sloss-Sheffield Steel & Iron Co. has announced unchanged prices for first quarter and has opened its books for that period.

For the past two weeks steel production has been at the lowest point of the year, and there will be no change this week. Twelve open hearths are operating, six at Fairfield, three at Ensley and three at Gadsden.

Republic Steel Corp. banked its No. 2 Thomas furnace last week, and has two left in production, one at Thomas and one at Gadsden. This reduces the district's total of active blast furnaces to 16.

Both the steel and iron markets continue quiet. Cotton tie shipments are still active but the buying season is over. A fair amount of plate tonnage was released last week to one producer. Sheet and wire products demand is light.

The Ensley rail mill resumed production on Nov. 3. This mill has orders for only 13,000 tons of rail from the Manchurian Railways on hand, but some additional export business is expected shortly, which will be sufficient to keep the mill operating for about four weeks. By then it is hoped that some domestic business will be available. The railroads have begun to show some interest in new tonnage.

Announcement was made last week that the Tennessee Coal, Iron & Railroad Co. has purchased the Texas warehouse of the Carnegie-Illinois Steel Corp., located at Houston, and will take charge immediately.

Pig iron shipments have lately slowed up and the current market is light. There is some intimation that one or two other furnaces may be banked unless the situation changes for the better.

. . .NON-FERROUS. . .

. . . Copper market stagnant; prices lowered to 11c.

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. . . Lead cut to 5c.; St. Joe restricts sales.

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. . . Tin sags to new lows on London weakness.

NEW YORK, Nov. 9.—The lack of encouraging factors in the domestic market, together with the erratic, but definitely downward, gyrations of the London commodity markets caused all the domestic non-ferrous metals, with the exception of zinc, to end the week with prices considerably below the previous week's levels. Electrolytic copper prices were lowered on Wednesday to 11.50c., and again on Thursday to 11c. per lb., Connecticut Valley, by the custom smelter that took the lead in previous price movements. Primary producers, however, continue to sell to company-owned fabricators on the 12c. basis. Most of the business transacted during the week involved inter-company contracts and brought the total of sales for the month up to 3560 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	Nov. 3	Nov. 4	Nov. 5	Nov. 6	Nov. 8	Nov. 9
Electrolytic copper, Conn.*	11.75	11.50	11.00	11.00	11.00	11.00
Lake copper, N. Y.	12.125	12.125	12.125	12.125	12.125	12.125
Straits tin spot, New York	46.00	45.00	44.125	....	42.50	43.00
Zinc, East St. Louis	5.75	5.75	5.75	5.75	5.75	5.75
Zinc, New York	6.10	6.10	6.10	6.10	6.10	6.10
Lead, St. Louis	5.10	4.85	4.85	4.85	4.85	4.85
Lead, New York	5.25	5.00	5.00	5.00	5.00	5.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 16.50c. a lb., prompt, f.o.b., New York.
Antimony, American, 16.25c. per lb., prompt shipment, New York.
Quicksilver, $85.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 11.25c. a lb., less carload, delivered in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	45.00c. to 46.00c.
Tin, bar	47.00c. to 48.00c.
Copper, Lake	13.00c. to 14.00c.
Copper, electrolytic	13.00c. to 14.00c.
Copper, castings	12.75c. to 13.75c.
*Copper sheets, hot-rolled	20.125c.
*High brass sheets	18.125c.
*Seamless brass tubes	20.875c.
*Seamless copper tubes	20.875c.
*Brass rods	14.625c.
Zinc, slabs	7.00c. to 8.00c.
Zinc sheets (No. 9), casks, 1200 lb. and over	13.00c.
Lead, American pig	6.00c. to 7.00c.
Lead, bar	7.25c. to 8.25c.
Lead, sheets, cut	8.50c.
Antimony, Asiatic	18.00c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	31.50c. to 32.50c.
Babbitt metal, commercial grade	20.00c. to 60.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	46.75c.
Tin, bar	48.75c.
Copper, Lake	13.00c. to 13.25c.
Copper, electrolytic	12.75c. to 13.00c.
Copper, castings	12.75c. to 13.25c.
Zinc, slabs	8.75c. to 9.00c.
Lead, American pig	5.50c. to 5.75c.
Lead, bar	9.00c.
Antimony, Asiatic	18.00c. to 18.50c.
Babbitt metal, medium grade	17.50c.
Babbitt metal, high grade	50.75c.
Solder, ½ and ½	26.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.125c.	8.375c.
Copper, hvy. and wire	7.50c.	8.00c.
Copper, light and bottoms	6.50c.	6.75c.
Brass, heavy	4.625c.	5.25c.
Brass, light	4.00c.	4.75c.
Hvy. machine composition	7.00c.	7.50c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or compos. turnings	6.75c.	7.25c.
Lead, heavy	4.50c.	4.875c.
Cast aluminum	10.625c.	11.75c.
Sheet aluminum	12.75c.	14.25c.
Zinc	3.00c.	3.375c.

Lead

Two cuts of $5 per ton on successive days, bringing quotations down to 5c. per lb., New York, have thus far failed to alter the present apathetic attitude of lead buyers. In the earlier part of the week there was the customary first-of-the-month flurry of December metal buying, but on the whole consumers seem satisfied to continue the hand-to-mouth buying that has characterized their activities for the past month. On Friday St. Joseph Lead Co. announced that it was not interested in selling lead on the 5c. basis and would limit sales to customers that have been using St. Joe brands exclusively.

Zinc

Heavy backlogs of undelivered metal served to protect the spelter market from the depressing factors abroad and at home that caused all the other metals to give ground during the week. Prime Western quotations remain unchanged at 6.10c. per lb., New York. Sales for the week totaled 928 tons, and deliveries amounted to 4627 tons, bringing undelivered stocks down to 71,900 tons. October statistics on slab zinc show that stocks rose to 23,817 tons from 13,517 tons in September, and shipments dropped to 40,345 tons from 47,737 tons in the previous month. Production in October rose slightly, amounting to 52,645 tons, as against 50,027 tons in September. Unfilled orders at the end of the month totaled 75,086 tons, as compared with 92,319 tons at the end of the preceding month.

Tin

Quotations dipped sharply during the week from a high of 46c. on Wednesday to 42.50c. on Monday. Today prices strengthened slightly and Straits metal was quoted at 43c. per lb., New York. The lack of buying in the face of such unusually low prices is attributed to several factors. First, declining tinplate operations have put consumers in a temporarily over-bought position, and secondly, pessimistic business sentiment has discouraged forward buying and tin users at present are working off heavy inventories. On first call in London this morning Straits metal was priced at £188 10s. for cash standards, and £187 5s. for three months' metal.

IRON AND STEEL SCRAP

. . . Weakness in railroad material is reflected in whole list.

o o o

. . . Composite declines to $13.50.

NOV. 9.—Sales of Pennsylvania Railroad scrap at Pittsburgh at a price around $14.50 and of a substantial tonnage of similar material at Youngstown for even less, the latter to be laid down in a broker's yard, are the best indication today of the present state of the market, in the absence of other tests. October lists went for around $18 at Pittsburgh. A sale of bundles at Detroit brought $10.50, as compared with $14.50 on a similar list a month ago. Quotations otherwise are largely nominal and brokers claim they can pick up material at much lower than quoted prices in some instances, although most have been marked down from 50c. to $1.

THE IRON AGE composite price is now down to $13.50, off 92c. from last week and $8.42 under the peak price of $21.92 last noted on April 6. The present figure compares with prices prevailing in late July, 1936, when ingot operations stood at 71 per cent of capacity.

Pittsburgh

The local market continues to show a softer tone and on the basis of brokers' offers and small coverages in addition to low bids received on railroad lists, No. 1 heavy melting is quotable at $13.50 to $14, off $1 a ton. Some brokers are even finding it possible to make small coverages at lower than $13.50. Bids on railroad lists were considerably below those of a month ago. A small tonnage on a local railroad list went to a broker at around $14.50. Up to Tuesday noon final disposition of the Pennsylvania scrap was not known, although bids on the railroad heavy melting ranged from $14.75 a ton downward. Railroad heavy melting is quotable this week at $14.50 to $15. Other scrap grades are off in sympathy.

Chicago

Continued disinterest on the part of mills toward any scrap offerings, and the consummation of broker-dealer sales as low as $12.50 have caused a reduction of 75c. a ton in heavy melting steel to $12.75 to $13.25. Trading is virtually at a standstill as operations continue to decline, and, although the entire list has been lowered this week, all quotations are nominal pending the return of district mills to the consuming markets.

Cleveland

With no new consumer demand and practically all shipments to northern Ohio mills held up, the market has become badly demoralized. Prices have further declined 50c. a ton on steelmaking grades and $1 a ton on blast furnace scrap, but these quotations are nominal and well above prices at which brokers claim to be able to buy scrap. Yard dealers are laying down some scrap purchased at well below present nominal quotations. Dealers claim to be able to buy No. 1 heavy melting steel as low as $11 to $12. A considerable tonnage of railroad steel is understood to have been purchased by a Youngstown broker at $14 to $14.50 to lay down in his yard.

Buffalo

With the complete absence of consumer interest, the market continues to soften. All prices quoted are nominal. The falling-off in open-hearth operations has had a drastic effect locally not only in the disappearance of buying, but in the regulations against shipping laid down by mills. Limited to a trickle of shipments as mills try to find room for heavy receipts of Lake and canal-bound scrap, dealers in many cases are being forced to rehandle material at added expense. At the same time they are faced with an increase in freight rates. The further fact that dealers have extensive financial interest in what they have already purchased but cannot deliver, complicates the situation.

St. Louis

The scrap iron market in St. Louis definitely is weaker. Neither mills nor dealers are buying, and no one knows what prices really prevail. Therefore, quotations of the preceding week are unchanged and nominal. Mills tell dealers that present inventories are ample to take care of their present bookings. A few cars of distress scrap have appeared. Missouri-Pacific has issued a list of 76 carloads.

Cincinnati

Old materials continue to slump. Heavy melting steel is bid $1 lower than last week, with dealer sentiment pessimistic. Curtailed steel mill and lower foundry operations have cut scrap movement sharply. Activity is limited to dealer purchases for yard supplies and occasional application against contract.

Detroit

Resuming its steady downward course after last week's $2 plunge, the Detroit scrap market again shows reductions of 50c. to 75c. per ton with the exception of foundry items, which are unchanged. A sale of bundles to an important consumer at $10.50 delivered near Detroit shows a reduction of $1 in that item. First definite indications that scrap soon will be laid down in quantities comes in form of an offer to buy No. 2 heavy melting steel at $8.50. On the other hand, an offer of 1000 tons of short shovel turnings at $7 failed to stir any interest.

New York

The market still shows weakness and prices for material on cars have been marked down further. Export prices on standard grades are much stronger, the price for No. 1 heavy melting steel having held its present level for over two weeks. There is still a large quantity of material on barges, but boats are more plentiful than they were. About 200,000 tons of scrap has yet to be shipped on the last order of 240,000 tons to the European cartel, but much of this tonnage has been covered. Representatives of the leading exporters are in Europe now conducting negotiations for first quarter requirements, which should be substantial.

Boston

Exporters currently loading two boats here are fully covered, consequently are buying little scrap. Pennsylvania consumers of blast furnace material, bundled skeleton, steel turnings, etc., are out of the market, and New England mills apparently have sufficient material to tide them over until inventory taking. The slight improvement in foundry buying of No. 1 machinery and textile cast has not held. Prices are purely nominal.

Philadelphia

The domestic market is still inactive and progressively weaker as the national steel rate continues to drop. About the only mill in the market is Phoenix, for whose account one broker is spasmodically paying $12 for No. 2. Export is quietly becoming more of a market factor, although prices being paid are varying considerably and tonnages are being accumulated in as undramatic a manner as is possible. One factor which might indicate confidence in the future is the unwillingness of railroads to liquidate much scrap on their monthly lists, evidently with the intention of holding back supplies for possibly better prices.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.50 to $14.00
Railroad hvy. mltng. ..	14.50 to 15.00
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails	14.50 to 15.00
Rails 3 ft. and under..	18.50 to 19.00
Comp. sheet steel	13.50 to 14.00
Hand bundled sheets..	12.50 to 13.00
Hvy. steel axle turn..	12.00 to 12.50
Machine shop turn.....	8.50 to 9.00
Short shov. turn.	8.50 to 9.00
Mixed bor. & turn.	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Cast iron carwheels....	15.00 to 15.50
Hvy. breakable cast...	12.50 to 13.00
No. 1 cupola cast.....	16.50 to 17.00
RR. knuckles & cplrs.	17.50 to 18.00
Rail coil & leaf springs	17.50 to 18.00
Ro led steel wheels....	17.50 to 18.00
Low phos. billet crops.	17.50 to 18.00
Low phos. sh. bar.....	17.00 to 17.50
Low phos. punchings..	16.50 to 17.00
Low phos. plate. hvy..	17.00 to 18.00
Low phos. plate clips..	15.00 to 15.50
Steel car axles	17.50 to 18.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.50 to $14.00
No. 2 hvy. mltng. steel.	11.50 to 12.00
Hydraulic bund., new..	13.50 to 14.00
Hydraulic bund., old...	10.50 to 11.00
Steel rails for rolling..	18.50 to 19.00
Cast iron carwheels...	17.50 to 18.00
Hvy. breakable cast...	15.00 to 15.50
No. 1 cast	17.50 to 18.00
Stove p'ate (steel wks.)	12.50 to 13.00
Railroad malleable	17.50 to 18.50
Machine shop turn....	10.00 to 10.50
No. 1 blast furnace ...	9.00 to 9.50
Cast borings	9.50 to 10.00
Heavy axle turnings...	12.50 to 13.00
No. 1 low phos. hvy...	21.00 to 21.50
Couplers & knuckles..	21.00 to 21.50
Rolled steel wheels....	21.00 to 21.50
Steel axles	21.50 to 22.00
Shafting	20.50 to 21.00
No. 1 RR. wrought	17.50 to 18.00
Spec. iron & steel pipe	14.50 to 15.00
No. 1 forge fire	14.50 to 15.00
Cast borings (chem.)..	13.50 to 14.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$12.75 to $13.25
Auto. hvy. mltng. steel a'loy free	11.50 to 12.00
No. 2 auto. steel	9.50 to 10.00
Shoveling steel	12.75 to 13.25
Hydraul. comp. sheets.	11.75 to 12.25
Drop forge flashings...	9.75 to 10.25
No. 1 busheling	11.75 to 12.25
Rolled carwheels	15.75 to 16.25
Railroad tires, cut....	16.25 to 16.75
Railroad leaf springs..	16.25 to 16.75
Steel coup. & knuckles	16.25 to 16.75
Axle turnings	12.25 to 12.75
Co'l springs	19.25 to 19.75
Ax'e turn (elec.)	12.75 to 13.25
Low phos. punchings..	16.25 to 16.75
Low phos. plates, 12 in. and under	16.75 to 17.25
Cast iron borings	7.50 to 8.00
Short shov. turnings...	8.00 to 8.50
Machine shop turn.....	6.00 to 6.50
Rerolling rails	15.25 to 15.75
Steel rails under 3 ft...	16.00 to 16.50
Steel rails under 2 ft...	16.50 to 17.00
Angle bars, steel	14.75 to 15.25
Cast iron carwheels ..	15.00 to 15.50
Railroad malleable	13.75 to 14.25
Agric. malleable	11.75 to 12.25
	Per Net Ton
Iron car axles	$19.00 to $19.50
Steel car axles	18.00 to 18.50
No. 1 RR. wrought ...	11.00 to 11.50
No. 2 RR. wrought ...	11.25 to 11.75
No. 2 busheling, old ...	4.75 to 5.25
Locomotive tires	14.75 to 15.25
Pipes and flues	9.25 to 9.75
No. 1 machinery cast..	11.25 to 11.75
Clean auto. cast.	11.25 to 11.75
No. 1 railroad cast. ...	10.25 to 10.75
No. 1 agric. cast.....	10.25 to 10.75
Stove plate	8.75 to 9.25
Grate bars	9.25 to 9.75
Brake shoes	9.25 to 9.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
Hydraulic bundles	13.50 to 14.00
Machine shop turn. ...	11.00 to 11.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.50 to $14.00
No. 2 hvy. mltng. steel.	12.50 to 13.00
Comp. sheet steel	13.00 to 13.50
Light bund. stampings.	9.50 to 10.00
Drop forge flashings...	13.00 to 13.50
Machine shop turn.....	9.00 to 9.50
Short shov. turn.	10.50 to 11.00
No. 1 busheling	12.50 to 13.00
Steel axle turnings ...	10.50 to 11.00
Low phos. billet and bloom crops	22.00 to 22.50
Cast iron borings	10.00 to 10.50
Mixed bor. & turn. ...	10.00 to 10.50
No. 2 busheling	9.50 to 10.00
No. 1 cast.	18.50 to 19.00
Railroad grate bars...	9.00 to 9.50
Stove plate	8.50 to 9.00
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	17.00 to 17.50
Railroad malleable	17.00 to 17.50
Cast iron carwheels...	16.00 to 16.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails	14.00 to 14.50
New hvy. b'ndled sheet	12.00 to 12.50
Old hydraul. bundles..	11.00 to 11.50
Drop forge flashings ..	12.00 to 12.50
No. 1 bushe'ing	12.00 to 12.50
Hvy. axle turnings ...	12.00 to 12.50
Mach'ne shop turn....	8.00 to 8.50
Knuckles & couplers..	17.00 to 17.50
Coil & leaf springs....	17.00 to 17.50
Rolled steel wheels....	17.00 to 17.50
Low phos. billet crops.	18.00 to 18.50
Shov. turnings	10.50 to 11.00
Mixed bor. & turn.....	9.00 to 9.50
Cast iron borings.....	9.00 to 9.50
Steel car axles	17.00 to 17.50
No. 1 machinery cast..	15.00 to 15.50
No. 1 cupola cast.	14.00 to 14.50
Stove p'ate	12.00 to 12.50
Steel rails under 3 ft...	17.50 to 18.00
Cast iron carwheels ..	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Chemical borings	11.50 to 12.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$14.00 to $14.50
No. 1 hvy. melting....	14.00 to 14.50
No. 2 hvy. melting....	13.00 to 13.50
No. 1 locomotive tires.	16.00 to 16.50
Misc. stand.-sec. rails.	14.00 to 14.50
Railroad springs	19.00 to 19.50
Bundled sheets	9.00 to 9.50
No. 1 busheling	9.00 to 9.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	16.00 to 16.50
Machine shop turn....	7.50 to 8.00
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	21.50 to 22.00
No. 1 RR. wrought	10.00 to 10.50
No. 1 RR. wrought	14.00 to 14.50
Steel rails under 3 ft...	17.50 to 18.00
Steel angle bars	16.00 to 16.50
Cast iron carwheels...	17.00 to 17.50
No. 1 machinery cast...	13.25 to 13.75
Railroad malleable	15.00 to 15.50
No. 1 railroad cast.....	13.25 to 13.75
Stove plate	10.75 to 11.25
Agricul. malleable	11.00 to 11.50
Grate bars	11.25 to 11.75
Brake shoes	10.50 to 11.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$11.00 to $11.50
No. 2 hvy. mltng. steel.	8.50 to 9.00
Scrap rails for mltng...	15.50 to 16.00
Loose sheet clippings..	7.50 to 8.00
Hydrau. b'ndled sheets	11.50 to 12.00
Cast iron borings	5.50 to 6.00
Machine shop turn. ...	7.00 to 7.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	4.00 to 4.50
Rails for rolling	17.50 to 18.00
No. 1 locomotive tires.	14.00 to 14.50
Short rails	18.00 to 18.50
Cast iron carwheels...	12.50 to 13.00
No. 1 machinery cast..	11.50 to 12.00
No. 1 railroad cast.....	10.00 to 10.50
Burnt cast.	6.50 to 7.00
Stove plate	6.50 to 7.00
Agricult. malleable ...	11.50 to 12.00
Railroad malleable ...	13.50 to 14.00
Mixed hvy. cast.	8.00 to 8.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$16.00 to $16.50
Scrap steel rails	.... 17.00
Short shov. turnings..	.... 8.50
Stove plate	.... 10.50
Steel axles	18.00 to 19.00
Iron axles	15.50 to 18.00
No. 1 RR. wrought....	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 18.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.50 to $10.00
No. 2 hvy. mltng. steel.	8.50 to 9.00
Borings and turnings..	5.75 to 6.25
Long turnings	5.25 to 5.75
Short shov. turnings..	6.25 to 6.75
No. 1 machinery cast..	12.00 to 12.50
Automotive cast.	13.00 to 13.50
Hvy. breakable cast...	10.50 to 11.00
Hydraul. comp. sheets.	10.00 to 10.50
Stove plate	7.75 to 8.25
New factory bushel.....	9.50 to 10.00
Old No. 2 busheling ..	5.50 to 6.00
No. 2 busheling (black fender stock)	Nominal
Sheet clippings	7.00 to 7.50
Flashings	8.75 to 9.25
Low phos. plate scrap.	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$10.50 to $11.00
No. 2 hvy. mltng. steel.	9.00 to 9.50
Hvy. breakable cast...	11.00 to 11.50
No. 1 machinery cast...	12.50 to 13.00
No. 2 cast.	10.50 to 11.00
Stove plate	8.50 to 9.00
Steel car axles	19.50 to 20.00
Shafting	17.00 to 17.50
No. 1 RR. wrought....	12.00 to 12.50
No. 1 wrought long...	11.00 to 11.50
Spec. iron & steel pipe	10.00 to 10.50
Rails for rolling	6.00 to 6.50
Clean steel turnings ..	6.00 to 6.50
Cast borings	6.00 to 6.50
No. 1 blast furnace....	5.50 to 6.00
Cast borings (chem.)..	11.00 to 11.50
Unprepar. yard scrap..	6.50 to 7.00

Per gross ton, delivered local foundries:

No. 1 machn. cast.....	$15.50 to $16.00
No. 2 cast.	11.00 to 11.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.30 to $13.80
Scrap rails	13.30 to 13.80
No. 2 steel	12.30 to 12.80
Breakable cast.	12.50 to 13.00
Machine shop turn.....	.... 6.20
Mixed bor. & turn.....	.... 4.60
Bund. skeleton long....	.... 7.95
Shafting	17.50 to 18.00
Cast bor. chemical....	8.50 to 9.00

Per gross ton delivered consumers' yards:

Textile cast.	$15.50 to $16.00
No. 1 machine cast.	15.50 to 16.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to $15.00
No. 2 hvy. mltng. steel.	.... 11.50

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. stl...		$14.00
No. 2 hvy. mltng. stl..	13.50	13.00
Mixed dealers steel...	12.50	12.00
Scrap pipe	11.75	11.50
Steel turnings	9.75	9.50
Cast borings	11.00	10.50
Machinery cast.	18.00	17.00
Dealers cast.	16.00	15.00
Stove plate	13.00	11.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel.	$13.00 to $13.50
No. 2 hvy. mltng. steel.	$11.50 to $12.00
No. 2 cast.	.... 11.00
Stove plate	8.50 to 9.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	.... $13.50
No. 2 hvy. mltng. steel.	.... 12.50
Rails (scrap)	.... 13.50
Philadelphia, delivered alongside boats, Port Richmond	
No market at present.	

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$37.00
Forging quality	43.00

Sheet Bars

F.o.b Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	2.10c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	48.00
F.o.b. Worcester, Mass.	49.00
F.o.b. Birmingham	50.00
F.o.b. San Francisco	56.00
F.o.b. Galveston	53.00

Rods over 9/32 in. to 47/64 in., inclusive, $5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.45c.
F.o.b. Chicago or Gary	2.50c.
F.o.b. Duluth	2.60c.
Del'd Detroit	2.60c.
F.o.b. Cleveland	2.50c.
F.o.b. Buffalo	2.55c.
Del'd Philadelphia	2.74c.
Del'd New York	2.78c.
F.o.b Birmingham	2.60c.
F.o.b cars dock Gulf ports	2.85c.
F.o.b. cars Pacific Ports	3.00c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.35c.
F.o.b. Buffalo	2.40c.
F.o.b. Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.85c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.60c.
Del'd Detroit	2.70c.
F.o.b. cars dock Gulf ports	2.95c.
F.o.b. cars dock Pacific ports	2.95c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.80c.
F.o.b. cars dock Pacific ports	2.80c.

Iron

F.o.b. Chicago	2.40c.
F.o.b. Pittsburgh (refined)	3.60c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.90c.
F.o.b. Cleveland, Chicago and Gary	2.95c.
F.o.b. Buffalo	3.00c.
F.o.b. Detroit	2.95c.

* In quantities of 16,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Gary	2.30c.
Del'd Cleveland	2.435c.
F.o.b Coatesville or Spar. Pt.	2.35c.
Del'd Philadelphia	2.435c.
Del'd New York	2.53c.
F.o.b. Birmingham	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.
Wrought iron plates, f.o.b. Pittsburgh	3.80c.

Floor Plates

F.o.b. Pittsburgh	3.50c.
F.o.b. Chicago	3.55c.
F.o.b. Coatesville	3.60c.
F.o.b. cars dock Gulf ports	3.90c.
F.o.b. cars dock Pacific ports	4.05c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Buffalo or Bethlehem	2.35c.
Del'd Philadelphia	2.455c.
Del'd New York	2.5025c.
F.o.b. Birmingham (standard)	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Chicago or Buffalo	2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports	3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb.	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$43.00
Light rails (from rail steel) per gross ton	42.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.40c.
No. 10, f.o.b. Gary	2.50c.
No. 10, del'd Detroit	2.60c.
No. 10, del'd Philadelphia	2.69c.
No. 10, f.o.b. Granite City	2.60c.
No. 10, f.o.b. Birmingham	2.55c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.
No. 10 wrought iron, Pgh.	4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	3.15c.
No. 24, f.o.b. Gary	3.25c.
No. 24, del'd Detroit	3.35c.
No. 24, del'd Philadelphia	3.44c.
No. 24, f.o.b. Granite City	3.35c.
No. 24, f.o.b. Birmingham	3.30c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	3.10c.
No. 10 gage, f.o.b. Gary	3.20c.
No. 10 gage, f.o.b. Detroit	3.30c.
No. 10 gage, del'd Philadelphia	3.39c.
No. 10, f.o.b. Granite City	3.30c.
No. 10 gage, f.o.b. Birmingham	3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.55c.
No. 20 gage, f.o.b. Gary	3.65c.
No. 20 gage, del'd Detroit	3.75c.
No. 20 gage, del'd Philadelphia	3.84c.
No. 20, f.o.b. Granite City	3.75c.
No. 20 gage, f.o.b. Birmingham	3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports	4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.80c.
No. 24, f.o.b. Gary	3.90c.
No. 24, del'd Philadelphia	4.09c.
No. 24, f.o.b. Granite City	4.00c.
No. 24, f.o.b. Birmingham	3.95c.
No. 24, f.o.b. cars, dock, Pacific ports	4.40c.
No. 24, wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars, dock, Pacific ports	4.30c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Gary	3.60c.
No. 20, f.o.b. Granite City	3.70c.
No. 20, f.o.b. cars dock Pacific ports	4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb.	3.30c.
No. 28, Gary	3.40c.
No. 28, f.o.b. Granite City	3.50c.
No. 28, cars dock Pacific ports, boxed	4.175c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.35
Standard cokes, f.o.b. Gary	5.45
Standard coke, f.o.b. Granite City	5.55

Special Coated Manufacturing Ternes

	Base per Box
F.o.b. Pittsburgh	$4.65
F.o.b. Gary	4.75
F.o.b. Granite City	4.85

Roofing Terne Plate
(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Hot-Rolled Hoops, Bands, Strip and Flats under ¼ In.

	Base per Lb
All widths up to 24 in., Pittsburgh	2.40c.
All widths up to 24 in., Chicago	2.50c.
All widths up to 24 in., del'd Detroit	2.60c.
All widths up to 24 in., Granite City	2.60c.
All widths up to 24 in., Birmingham	2.55c.
Cooperage stock, Pittsburgh	2.50c.
Cooperage stock, Chicago	2.60c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	3.20c.
F.o.b. Cleveland	3.20c.
Del'd Chicago	3.48c.
F.o.b. Worcester	3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.45c.
No. 20, Pittsb'gh or Cleveland	3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $5 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.75
Smoth coated nails	$2.75
Cut nails, carloads	$3.60

	Base per 100 Lb.
Annealed fence wire	$3.15
Galvanized fence wire	3.55
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column.	74
Single loop bale ties, base col.	63

Chicago and Andersen, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	Wrought Iron In.	Black	Galv.
⅛	52	31	⅛ & ¼	+13	+35
¼ to ⅜	55	38½	½	20	1½
½	59½	49	¾	26	8
¾	62½	53	1 & 1¼	30	14
1 to 3	64½	55½	1½	34	16½
			2	33½	16

Lap Weld

2	57	47½	2	26½	10
2½ & 3	60	50½	2½ to 3½	27½	12½
3½ to 6	62	52½	4	29½	16
7 & 8	61	50½	4½ to 8	28½	15
9 & 10	60½	50	9 to 12	24½	10
11 & 12	59½	49			

Butt Weld, extra strong, plain ends

⅛	50½	36½	⅛ & ¼	+14	+48
¼ to ⅜	52½	40½	½	21	4
½	57½	48½	¾	27	10
¾	61½	52½	1 to 2	34	17½
1 to 3	63	55			

Lap Weld, extra strong, plain ends

2	55	46½	2	29½	13½
2½ & 3	59	50½	2½ to 4	35	20½
3½ to 6	62½	54	4½ to 6	33½	19
7 & 8	61½	51	7 & 8	34½	19½
9 & 10	60½	50	9 to 12	28	15½
11 & 12	59½	49			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d.	13 B.W.G.	11.21	9.96
1½ in. o.d.	13 B.W.G.	12.38	11.00
1¾ in. o.d.	13 B.W.G.	14.09	12.51
2 in. o.d.	13 B.W.G.	15.78	14.02
2¼ in. o.d.	13 B.W.G.	17.60	15.69
2½ in. o.d.	12 B.W.G.	19.37	17.21
2¾ in. o.d.	12 B.W.G.	21.22	18.95
3½ in. od.	12 B.W.G.	22.49	19.98
3 in. o.d.	12 B.W.G.	23.40	20.97
4½ in. o.d.	10 B.W.G.	45.19	40.15
3½ in. o.d.	11 B.W.G.	29.79	26.47
4 in. o.d.	10 B.W.G.	36.96	32.83
5 in. o.d.	9 B.W.G.	56.71	50.38
6 in. o.d.	7 B.W.G.	87.07	77.35

Extra for less-carload quantities:

40,000 lb. or ft. or over					Base
30,000 lb. or ft.	to	39,999	lb. or ft.		5%
20,000 lb. or ft.	to	29,999	lb. or ft.		10%
10,000 lb. or ft.	to	19,999	lb. or ft.		20%
5,000 lb. or ft.	to	9,999	lb. or ft.		30%
2,000 lb. or ft.	to	4,999	lb. or ft.		45%
Under 2,000 lb. or ft					65%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in. f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, $3 extra. 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago; and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
⅛ in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:	
⅛ in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60
Stove bolts in packages, nuts attached	70
Stove bolts in packages, with nuts separate	70 and 10
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland..$3.60
F.o.b. Chicago or Birmingham.. 3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more.)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	3.00c.
Delivered, Detroit	3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
200 (⅛% Nickel)	$0.35
2100 (1¼% Nickel)	0.75
2300 (3½% Nickel)	1.55
2500 (5% nickel)	$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.90
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finishd Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	80c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	22s. 9d. to 23s. 6d.
Steel bars, open-hearth	£11
Beams, open-hearth	£11 2s. 6d
Channels, open-hearth	£11 7s. 6d
Angles, open-hearth	£11 2s. 6d
Black sheets, No. 24 gage	£15
Galvanized sheets, No. 24 gage	£13 15s.

CONTINENTAL

Per Gross Ton, Gold f. f.o.b. Continental Ports

Billets, Thomas	£5 7s. 6d.
Wire rods, No. 5 B.W.G.	£6 10s.
Steel bars, merchant	£6
Sheet bars	£5 8s. 6d.
Plate ¼ in. and up	£7 7s.
Plate 3/16 in. and 5 mm.	£7 13s.
Sheet, ¼ in.	£8 9s. 6d.
Beams, Thomas	£5 8s.
Angles (Basic)	£6 2s. 6d.
Hoops and strip, base	£6 10s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Per Net Ton
Plates	3.70c.
Structural shapes	3.70c.
Soft-steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large .....1 to 24 kegs	3.90c.
	Per Cent Off List
Track bolts, all sizes per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	$4.35
Wire, black, soft ann'l'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

* Delivered in Pittsburgh switching district.

** Prices on application.

CHICAGO *Base per Lb.*

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	$4.40
Track bolts (keg lots)	5.05
Rivets, structural (keg lots)	**4.95
Rivets, boiler (keg lots)	**5.05
	Per Cent Off List
Machine bolts and carriage bolts, ½ in. and smaller	60
Lag screws	*55 and 5
Hot-pressed nuts, sq. and hex., tap or blank, ½ by 6 in. and smaller	60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.25 to 7.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled: strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.32c.
Galvanized sheets (No. 24*)	4.50 to 5.47c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.35c.
Floor plate, ¼ in. and heavier	5.60c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 5)	4.25c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.
	Per Cent Off List
Machine bolts, square head and nut: All diameters. Prices on application	
Carriage bolts, cut thread: All diameters. Prices on application	

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.39c.
2 galv. corrug. sheets	5.54c.
Structural rivets	5.29c.
Boiler rivets	5.39c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	50
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	60

* No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.90c.
*Structural shapes	3.90c.
*Soft steel bars, small shapes, iron bars (except bands)	4.00c.
‡Reinforc. steel bars, sq. twisted and deformed	3.53c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	4.10c.
*Spring steel	5.50c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	4.00c.
*Diam. pat. floor plates, ¼ in.	5.25c.

These prices are for delivery in Philadelphia trucking area.

* Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95
	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

† Outside delivery 10c. less.

* For 5000 lb. or less.

‡ Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.95c.
Floor plates	5.55c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$3.48
Com. wire nails, base per keg: Any quantity less than carload	3.20
Cement c't'd nails, base 100-lb. keg	3.50
Chain, lin. per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes, 2-in.	20.73
4-in.	48.41

BUFFALO *Base per Lb.*

Plates	3.92c.
Floor plates	5.52c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.30c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON

	Base per Lb.
Channels, angles	4.20c.
Tees and zees, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern	5.12c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.49c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

*Under 400 lb., .50c. over base, 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c; 3500 lb. and over, base less 15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60-5
1⅛ in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.	50
200 lb. and over:	
½ in. and smaller	62½
9/16 to 1 in.	60
1⅛ in. and over	50

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BIRMINGHAM

Bars and bar shapes	$3.85 base	
Structural shapes and plates	3.75 "	
Hot rolled sheets No. 10 ga.	3.80 "	
Hot rolled sheets No. 24 ga.	4.40 "	3500 lb. and over
Galvanized sheets No. 24 ga.	5.05 "	3500 lb. or more
Strip	4.05 "	
Reinforcing bars	3.85 "	
Floor plates	5.96 "	
Cold finished bars	4.91 "	
Machine and carriage bolts	.50 & 10 off list	
Rivets (structural)	$4.60 base	

On plates, shapes, bars, hot rolled strip, heavy hot rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.50c.
Galvanized sheets, No. 24, 100 bdls. or more	$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Reinforcing shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.31c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.35c.
Boiler rivets	4.35c.
Common wire nails, base per keg	$3.55
Bolts and nuts, per cent off list	60

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	$3.40	$3.40	$3.40

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	3.00

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$54.00
Chicago District	62.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester	$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F. o.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$25.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.00
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa. Steelton, Pa., and Standish, N. Y.	$28.50

Gray Forge

Valley or Pittsburgh furnace	$23.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 22.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$1.80
Ferrotungsten, lots of 5000 lbs., nominally	1.85
Ferrotungsten, smaller lots, nominally	1.90
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.*
Ferrochromium, 2% carbon	16.50c to 17.00c.*
Ferrochromium, 1% carbon	17.50c. to 18.00c.*
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.*
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.*
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50*
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	63.50
Ferrophosphorus, electric, 24% in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	80.00
Ferromolybdenum, per lb. Mo del	95c.
Calcium molybdate, per lb. Mo del	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

* Spot prices are $5 a ton higher. Spot premium on 75 per cent ferrosilicon is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50%	$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	50c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered	Nominal
Tungsten, domestic, scheelite delivered	$26.00 to $28.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	26.50
Turkish, 48-49%	25.50 to $26.50
Turkish, 45-46%	23.50 to 24.00
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
50%	$25.50 to $26.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$20.00
Domestic, barge and rail	21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	22.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$1.50

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.875c.
Del'd Cleve'd, No. 4 industrial	5.75c.
Del'd Cleve'd, No. 5 industrial	4.75c.

COKE AND COAL

Coke *Per Net Ton*

Furnace, f.o.b. Connellsville, Prompt	$4.25 to $4.50
Foundry, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports	14.75

Coal *Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

NIAGARA FALLS, N.Y.

Sales Offices: NEW YORK—30 Church St. • PITTSBURGH—Oliver Bldg. • CLEVELAND—Hanna Bldg.

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . November off to a poor start in most centers.

o o o

. . . Many machinery purchases likely to be deferred until after Jan. 1.

o o o

. . . Long term outlook is much better, with many plant expansion programs announced, particularly in the automotive and allied industries.

Pittsburgh

INQUIRIES have slowed up slightly over the past week, but a fair volume is still in evidence. Orders have tapered off some owing to the temporary holdups on some projects. Another factor responsible to some degree for the falling off in machine tool business is the fact that many companies have expended 1937 appropriations and must wait until 1938 estimates are approved. October business ran from 15 to 20 per cent below the September volume. Interesting is the fact that machine tool business so far has not shown as marked a decline as other lines of industrial activity.

Cleveland

THE machine tool market had a poor start in November. While one distributer reports a slight gain in single tool orders the past week, others have not experienced an improvement. New orders are mostly for tools that can be delivered rather promptly, buyers not being interested in purchasing equipment for very extended deliveries. Live inquiries are very scarce. Many plants listed as probable purchasers have advised machinery salesmen that they will not consider the purchase of any equipment during the remainder of the year. The Chesapeake & Ohio Railroad has deferred action on its recent list of several machines.

Cincinnati

MACHINERY business is almost stationary at levels established in the past four weeks. New business, while not in the brisk proportions of the first half, is nevertheless at encouraging rate. Consumer interest to care for retooling needs is apparent, but replacement beyond necessity is lagging. Lathe manufacturers reported demand a trifle better than market average with milling and grinding equipment following closely. Other tools are holding market average to about 45 to 50 per cent of capacity. Steady, though unsensational interest in planers and boring mills adds an undertone of solidity to the market and tends to keep a more optimistic feeling. In addition, inquiries are steadily brisk and with any opening of users' budgetary limits, new business is an almost certainty. Outstanding inquiry is from a Far Eastern nation for several hundred lathes.

Detroit

A TURN for the better is indicated by revelation of numerous plans for expansion, despite what seem to be unfavorable conditions. Contracts for the erection of a huge Ford press plant have been let, with construction to be completed in about nine months. The Sunlight Electrical Division of General Motors in Warren, Ohio, will soon erect a new plant practically double the size of its present factory. The newly organized Motherwell Mfg. Co. in the old plant of the Eaton Axle & Spring works, Pontiac, will absorb about $75,000 worth of machinery and equipment. Six drop hammers, a machine shop and heat-treatment equipment will be included in the set-up. Continental Motors Corp. will replace its small aircraft engine of 40 hp. with a new model about the first of the year. Plymouth and Dodge are designing new engines for 1939 and are expected to require new machine setups. Nash will manufacture trucks starting next spring, and the Diamond T Truck plant probably will be expanded soon. Forthcoming changes in Canadian tariff regulations which will increase the requirements for Empire content of cars manufactured in Canada will result in continued inquiries and orders for a large variety of equipment, the most recent noted being the sale of 20 riveters at the Chrysler plant in Windsor, Ont.

Chicago

MACHINE tool business, after holding up rather well while activity in steel and other industries was fast declining, has joined the ranks now, and a definite slowing down is reported from all sides. Small tool orders during October were as much as a third under September sales, and present inquiries indicate a continuation of this trend. While the drop in machine tool activity has not been so noticeable as in small tools, it is nevertheless easily seen, and sellers do not expect a steady upward move until spring at least. Most plants have sufficient orders on hand to last through the first of the year, but new business is slow in being closed, so that less activity in the first quarter of 1938 is almost certain. Operations and employment at machine tool builders' plants in this territory are little changed, as old orders are still being worked on. One of the major problems to be faced by the trade here, and elsewhere, is that of taxes. Administration policies and legislation antagonistic toward business, or the threat of further action in that direction, is holding back many industrial programs, foremost among which are some expansion plans of the International Harvester Co.

New York

NEW business showed a decided falling off the first week of the month, but this was to be expected since most deals in this territory are made toward the end of the month, making the first part rather lean. The volume of business done thus far, however, has been very light. Of significance is the fact that of the few purchasers of equipment were two companies of national reputation, one a maker of sewing machines, the other of locomotives. New locomotive orders have been scarce since July, there being none in October, but apparently this builder is looking forward to a replenishment of orders shortly after the first of the year when this new equipment, purchased during the last fortnight, will be delivered. Billings are at a high level as machinery sold some months back is being delivered at a rate much in excess of current orders. Inquiries have fallen off to a large extent, with the exception of screw machines. The market outlook for this type of production machinery is bright for the next few months. Small tool and cutter sales are being maintained, indicating no appreciable fall in production activity, although layoffs are reported in some plants.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Circle Wire & Cable Corp., 24 Woodward Avenue, Brooklyn, insulated wire and cable, etc., has let general contract to H. Rosen, 50 Court Street, for new one-story plant, 250 x 600 ft., at Maspeth, L. I. Cost close to $500,000 with equipment. Saul Goldsmith, 84 Livingston Street, Brooklyn, is architect and engineer.

Continental Can Co., 100 East Forty-second Street, New York, has let general contract to A. S. Low, 510 North Dearborn Street, Chicago, for one-story addition to plant at 7600 South Racine Avenue, Chicago, 184 x 200 ft. Cost over $300,000 with equipment. W. H. Farnum, 510 North Dearborn Street, Chicago, is architect.

Jacob Ruppert, 1639 Third Avenue, New York, operating Ruppert Brewery, has leased two-story building at Norfolk, Va., and will remodel for new mechanical-bottling works, to be operated by Jacob Ruppert Virginia Bottling Corp., Norfolk, now being organized. Cost about $75,000 with equipment.

Radio Engineering Laboratories, Inc., 25-14 Forty-first Avenue, Long Island City, manufacturer of radio equipment and parts, has leased three-story building at 35-19 Thirty-sixth Avenue, and will remodel for new plant, removing present works to new location and increasing capacity.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 16 for 70 pneumatic drills and 141 pneumatic grinding machines for Brooklyn, Philadelphia, Charleston and other Navy yards (Schedule 2020); one electrically-operated airplane elevator and spare parts (Schedule 2019); until Nov. 19, 12,000 jack knives for Brooklyn yard (Schedule 2055).

General Electric Co., Schenectady, N. Y., has asked bids on general contract for one-story and basement addition to branch plant at Pittsfield, Mass., 80 x 500 ft. Cost over $200,000 with equipment.

A.B.C. Steel Equipment Co., 702 Broadway, New York, manufacturer of steel shelving, has leased a floor in building at 205 East Twenty-second Street for plant.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Nov. 15 for 51 sets of steel chasers (Circular 316); until Nov. 29, 538 gross of commercial stainless steel balls (Circular 319).

Armour & Co., Union Stock Yards, Chicago, meat packers, have let general contract to Karno-Smith Co., Broad Street Bank Building, Trenton, N. J., for new one-story branch plant at Trenton. Cost over $60,000 with equipment.

State Purchase Commissioner, State House, West State Street, Trenton, N. J., asks bids until Nov. 15 for steel lockers, steel furniture and other steel equipment for armory; also for one tractor with power mower and snow plow attachment.

Trenton Pipe Nipple Corp., Trenton, N. J., recently organized by Henry R. Glazer and associates, has leased one-story building at 10-16 Cole Street, with adjoining one-story structure, and will remodel for manufacture of pipe nipples and kindred products. Production is scheduled to begin in December.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Nov. 15 for one motor-driven hack-saw (Circular 428), equipment for modernizing and motorizing five lathes (Circular 408); until Nov. 16, one grinder and cutter (Circular 427); until Nov. 17, four motor-driven surface grinders (Circular 430).

International Chain & Mfg. Co., Norway and Elm Streets, York, Pa., manufacturer of coil and other iron chains, plans rebuilding part of plant recently destroyed by fire. Loss close to $400,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 16 for forged steel valves (Schedule 2029); until Nov. 19, one electric-operated fuel oil heater (Schedule 2066), for Philadelphia Navy Yard; 90,000 ft. of flexible steel cable (Schedule 2034) for Philadelphia, Quantico and San Diego yards.

NEW ENGLAND

Colonial Beacon Oil Co., Inc., 378 Stuart Street, Boston, plans new bulk oil storage and distributing plant at Ligonia, Me., with pumping station and other mechanical divisions, and steel tanks. Cost over $200,000 with equipment. Completion is scheduled for next spring, when company will remove present bulk terminal at East Deering, Me., to new location.

G. F. Heublein & Brother, 305 Broad Street, Hartford, Conn., food products, have awarded general contract to S. C. Porias & Co., Hartford, for one-story addition to former works of SKF Industries, Inc., 330 New Park Avenue, recently acquired for new plant, including improvements in existing buildings. Cost over $60,000. Carl J. Malmfeldt, Hartford, is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Nov. 15 for cams and one set of tools for automatic screw machine (Circular 65), aluminum alloy castings (Circular 66), seamless steel tubing (Circular 68).

Fremont Casting Co., 105 Fremont Street, Worcester, Mass., manufacturer of gray iron castings, has let general contract to Fiske Carter Construction Co., 8 Norwich Street, for one-story addition, 28 x 60 ft.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 19 for one electric heat-treating furnace for Newport, R. I., Naval Station (Schedule 2070).

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Nov. 17 for nine air compressors, one high-pressure steam and chemical oil-fired electric-driven cleaner, one power saw and two 1½-ton chain hoists (Proposal 398-38).

Division of Purchase, Sales and Traffic, Department of Agriculture, Washington, has let general contract to McCloskey & Co., 1620 West Thompson Street, Philadelphia, for new research station for Bureau of Public Roads at Abingdon, Va., comprising one-story mechanical and electrical shops, laboratory buildings and steam power house, at price of $967,000 exclusive of machinery.

School Board, Norfolk, Va., will install manual training department in new two-story school in Ocean View district, for which bids will be asked on general contract early in December. Cost about $200,000. Ferguson, Meakin & Moore, New Monroe Building, Norfolk, are architects.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 18 for hand tools, wrenches, wheel pullers, grinding machines, buffing and sanding equipment, 24,000 lin. ft. of galvanized steel wire netting, galvanized turnbuckles, screw pin shackles, locomotive springs, rail clips, copper pipe, galvanized steel bolts and other equipment (Schedule 3299).

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Nov. 23 for cadmium-coated wire springs in lots of 40,000 to 80,000 (Circular 136).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 19 for one 3000-lb. electric-powered drive and lift truck, with elevating platform (Schedule 2068) for Sewall's Point Navy Yard; two electric generating sets (Schedule 2061) for Quantico Navy Yard; 103,100 aluminum cartridge base tanks (Schedule 2025), boat crane equipment (Schedule 1896), anti-friction bearing control pulleys for aircraft (Schedule 2008); until Nov. 23, chisels and chisel blanks (Schedule 2039), steel wire nails (Schedule 2023), anchor shackles and wire rope thimbles (Schedule 2022) for Eastern and Western Navy yards.

SOUTH ATLANTIC

Commanding Officer, Ordnance Department, Augusta Arsenal, Augusta, Ga., asks bids until Nov. 17 for malleable iron pipe fittings, black wrought iron pipe, unions, nipples, pipe hangers, bolts, nuts, washers, screws, lock washers, etc. (Circular 8).

T. G. Strange, Rome, Ga., has acquired former plant of Orangeburg Packing Co., Orangeburg, S. C., and will modernize for new food packing and canning plant, including several one-story units. Cost over $100,000 with machinery.

SOUTH CENTRAL

Hattiesburg Bottling Co., Hattiesburg, Miss., has let general contract to Oden & Glenn, Hattiesburg, for one-story mechanical-bottling plant. Cost close to $40,000 with equipment.

Sewerage and Water Board, New Orleans, plans new electric-operated pumping station at London Avenue and Prentis Street for municipal water system. Cost about $150,000 with pumping units and auxiliary equipment. Baldwin Wood is engineer.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Nov. 18 for six intake gates, one trash rack complete with trash gate hoist and embedded parts, and steel frames for six temporary bulk-heads for intake and trash sluice of Guntersville dam; also until Nov. 24 for gantry cranes for spillway and intake gates for Guntersville and Chickamauga dams, and gate-lifting extensions for gantry cranes at Pickwick Landing dam.

Board of Directors, State Normal College, Natchitoches, La., will ask bids soon on general contract for new high and trades school building on campus. Cost about $550,000 with equipment. Financing has been arranged through Federal aid, with provision that work is to start by January. Weiss, Dreyfous & Seiferth, Maison Blanche Building, New Orleans, and Edward F. Neild, City Bank Building, Shreveport, La., are associated architects.

WESTERN PA. DIST.

Kelsey-Hayes Wheel Co., 3600 Military Avenue, Detroit, steel automobile wheels and other automobile products, has asked bids on general contract for part of erection of new plant on 30-acre tract at Neville Island, Pittsburgh, recently acquired. Cost close to $1,000,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

United States Engineer Office, New Post Office Building, Pittsburgh, asks bids until Nov. 22 for one bulkhead crane, bulkhead and derrick for Tygart River Reservoir dam, near Grafton, W. Va. (Circular 153).

Vesta Coal Co., Third and Ross Streets, Pittsburgh, plans new hoist house, with electric-operated equipment, at coal-mining properties in Bealls Borough, Washington County, Pa. Cost over $35,000 with equipment.

MICHIGAN DISTRICT

Motherwell Mfg. Co., Pontiac, Mich., care of Alexander A. Motherwell, 1633 Lawrence Avenue, Detroit, president, recently organized with capital of $100,000 to manufacture drop forgings, has leased former plant of Eaton Axle & Spring Works, Pontiac, and will remodel for new plant. Equipment to cost about $75,000 will be installed. It is proposed to have works ready for operation in December. Earl Lowe will be an official of new company.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, has let general contract to Bryant & Detwiler Co., Penobscot Building, for two one-story additions, about 69,700 sq. ft. of floor space, and one-story boiler house. Cost over $100,000 with equipment. Giffels & Vallet, Inc., and L. Rossetti, Marquette Building, are associated architects and engineers.

Superintendent of Lighthouses, 3760 East Jefferson Avenue, Detroit, asks bids until Nov. 15 for one diesel engine-driven air compressor and one motor-driven air compressor, including spare parts.

Park Chemical Co., 8074 Military Avenue, Detroit, industrial chemicals, etc., has let general contract to Bennage & McKinstrie Co., 4612 Woodward Avenue, for one-story addition. Cost close to $45,000 with equipment. Giffels & Vallet, Inc., and L. Rossetti, Marquette Building, are associated architects and engineers.

Parker Rust-Proof Co., Detroit, is erecting a two-story building, 148 x 152 ft., to provide additional office, laboratory, storage and metal shop space.

OHIO AND INDIANA

Timken Foundation, Canton, Ohio, H. H. Timken, director, plans new three-story technical high school, 200 x 200 ft., for which bids will be asked soon on general contract. Cost about $1,000,000 with equipment. On completion school will be operated by Canton Board of Education. J. H. Mason, superintendent of schools, and Frank Malick, vocational director, are in charge of plans.

Gibbs Mfg. Co., Sixth Street, N.E., Canton, Ohio, manufacturer of toys, has let general contract to L. W. Kilgore Co., 1311 Cherry Street, N.E., for one-story addition. Cost about $45,000 with equipment.

Bailey Meter Co., 1050 Ivanhoe Road, Cleveland, recording meters and control systems, has let contract to J. L. Hunting Co., Ninth and Chester Building, for one-story mezzanine floor in plant, 50 x 260 ft.

Pocahontas Oil Corp., Euclid Avenue and Nickel Plate Railroad, Cleveland, has let general contract to Carl W. Schultz, 4310 Henritze Avenue, for one and two-story and basement bulk oil storage and distributing plant, 130 x 135 ft. Cost about $130,000 with tanks and equipment.

Contracting Officer, Materiel Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Nov. 15 for rewind drive clutch cone assemblies, bomb release handle assemblies, fixed gun ring-cross sight assemblies, tow target windlass brake band assemblies (Circular 381), hydraulic fuel cock controls (Circular 323); until Nov. 26, 38 alternator assemblies and 38 dynamotor assemblies (Circular 384), 700 by-pass and balanced relief fuel type valve assemblies, 900 relief type valve assemblies (Circular 382).

Board of Public Works, City Hall, Washington, Ind., asks bids until Nov. 22 for extensions and improvements in municipal electric power plant, including new 3000-kw. turbo-generator unit and accessories, combustion control apparatus and other equipment. Bevington-Williams, Inc., Indiana-Pythian Building, Indianapolis, is consulting engineer.

SOUTHWEST

International Harvester Co., 606 South Michigan Avenue, Chicago, has let general contract to Manhattan Construction Co., Tulsa, Okla., for one-story factory branch, storage and distributing plant at Tulsa, totaling 37,000 sq. ft. floor space, with shop and service division, 85 x 200 ft. Cost about $100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 19 for one test bench for generator and magneto work (Schedule 2067) for Kansas City, Kan.

Chrysler Corp., Funston and Chrysler Roads, Kansas City, Kan., has arranged with Kansas City Industrial Land Co. for one-story L-shaped addition, 200 x 250 ft., to factory branch, storage and distributing plant. Bids will be asked at once on general contract. Cost about $200,000 with equipment. Charles E. Keyser, 609 Minnesota Avenue, Kansas City, Kan., is architect.

Public Service Co. of Oklahoma, Tulsa, Okla., has authorized expansion and improvements in steam-electric generating station at West Tulsa, including 20,000-kw. turbo-generator unit and accessories. Cost about $1,000,000. Company also will make line extensions to cost a similar amount. Work will be carried out in 1938.

Humble Oil & Refining Co., Humble Building, Houston, Tex., has approved plans for new natural gasoline plant in Calhoun County, near Victoria, Tex., with compressor station, boiler plant, steel tank storage division and other facilities. Cost over $250,000 with equipment.

Red Bluff Water Power Control District, Pecos, Tex., asks bids until Nov. 30 for equipment of 1000-kw. diesel-electric generating plant, and 55 miles of transmission lines.

Weslaco Citrus Association, Weslaco, Tex., has let general contract to Noser Construction Co., McAllen, Tex., for one-story citrus fruit-packing plant, 120 x 140 ft. Cost about $45,000 with conveying, loading and other mechanical-handling equipment.

BUFFALO DISTRICT

Beals, McCarthy & Rogers, Inc., 50 Terrace Street, Buffalo, iron and steel products, hardware, etc., has let general contract to Charles Berrick Sons Co., 1151 Main Street, for one-story addition, 26 x 190 ft. Cost over $60,000 with equipment. Award also has been made for one-story building, 35 x 50 ft., adjoining, for office and operating service.

United States Engineer Office, Federal Building, Buffalo, asks bids until Nov. 17 for wrought iron pipe, pipe fittings, galvanized unions, elbows, reducers, flanges, etc. (Circular 61).

Lincoln Enterprises, Inc., Ithaca, N. Y., care of A. N. Gibb, 301 East State Street, architect, will take bids soon on general contract for one-story plant on Hudson Street, for manufacture of electric meters and kindred electrical products. Cost about $45,000 with equipment. L. S. Urquhart, 303 Green Street, is engineer.

MIDDLE WEST

Standard Transformer Corp., 850 West Blackhawk Street, Chicago, manufacturer of radio transformers, etc., has asked bids on general contract for two-story and basement addition, 25 x 75 ft., and improvements in present plant. Cost about $50,000 with equipment. Alexander & Brandt, 22 West Monroe Street, are architects.

Central Refining & Asphalt Corp., 7626 East Lake Terrace, Chicago, recently organized with capital of $100,000, has acquired tract 400 x 526 ft., near Kedzie Avenue and Vermont Street, for new oil products and asphalt refining plant, including storage and distributing tanks and facilities. Cost over $75,000 with equipment.

Des Moines Packing Co., 1700 Maury Street, Des Moines, Iowa, meat packer, has plans for one-story addition and will begin superstructure at once by day labor. Cost over $50,000 with equipment. Kraetsch & Kraetsch, 207 Davidson Boulevard, are architects.

United States Engineer Office, Fort Peck, Mont., asks bids until Nov. 15 for wrenches, bolts and dies, hand taps, tap wrenches and dies, and other equipment (Circular 141).

J. I. Case Co., Racine, Wis., manufacturer of agricultural machinery and implements, has asked bids on general contract for one-story factory branch, storage and distributing plant at Sioux Falls, S. D. Cost over $60,000 with equipment. Frank Hoffman, Racine, is architect.

Chicago Railway Equipment Co., 1928 West Forty-sixth Street, Chicago, has let general contract to Alberts Brothers, 7945 Champlain Avenue, for one-story building, 51 x 160 ft., at 4541 Damen Avenue, for storage and distribution. Cost close to $40,000 with equipment. Homer G. Sailor, 733 West Sixty-fourth Street, is architect.

Des Moines Ice & Fuel Co., Des Moines, Iowa, plans rebuilding of two tipples at coal mining properties near city limits, recently destroyed by fire. Loss about $50,000 with elevating, loading and other mechanical equipment.

Nelson Concrete Culvert Co., headquarters in Champaign, Ill., has purchased a site at 26th Street and McCasland Avenue, East St. Louis, Ill., and is building a plant to manufacture concrete pipe culverts from six to 108 in. in diameter.

Atchison, Topeka & Santa Fe Railway Co. is enlarging its passenger engine and coach terminal at Chicago. Expansion includes diesel engine and air conditioning repair shop, 65 x 100 ft., equipped with overhead traveling crane. On one side of this building will be a wheel shop with facilities for handling roller bearings on diesels and lightweight equipment. A two-story building, about 65 x 100 ft., and one-story structure, 30 x 400 ft., will accommodate other activities, such as Pullman servicing, generators, battery repair, paint shops, storage facilities, etc. Plans also include erection of a new power house and enlargement of roundhouse and turntable.

Highway Trailer Co., Edgerton, Wis., manufacturer of automotive equipment, principally for freight transportation, has plans for factory addition to cost $50,000, consolidating operations now being carried on in branch factory at Stoughton, Wis.

Screw Machine Products Co., Inc., 1305 North Fourth Street, Milwaukee, will start construction shortly on new factory, 80 x 200 ft., one-story and part basement, in Town of Lake, Milwaukee County, increasing capacity about 30 per cent and costing about $50,000. Architect is Mark F. Pfaller, 8525 Ravenswood Circle, Wauwatosa, Milwaukee.

Hamilton-Beach Co., Racine, Wis., manufacturer of fractional horsepower electric motors, motor-driven appliances, etc., expects to start work soon on third-story addition to polishing and plating building to cost $30,000. Frank J. Hoffman, 201 Sixth Street, is architect.

International Harvester Co., Chicago, has plans for two additions to Milwaukee branch factory at 1714 West Bruce Street, manufacturing tractors, cream separators and other specialties. Additions to be used largely for gear work, heat treating, etc. Edward J. Leiser is general superintendent at Milwaukee.

PACIFIC COAST

Western Pacific Railway Co., Mills Building, San Francisco, plans one-story shop addition, 150 x 300 ft., to locomotive and car construction and repair shops at Sacramento, Cal. Cost close to $200,000 with equipment.

Eugene Extruded Metals Co., 351 South Clarence Street, Los Angeles, has let general contract to William P. Neil Co., Ltd., 4814 Loma Vista Avenue, for new one-story plant, 150 x 200 ft., at 711 East Fifty-ninth Street. Cost over $85,000 with equipment. M. T. Cantell, 2256 Loma Vista Boulevard, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 19 for two or three motor-driven radial drills (Schedule 1951) for Puget Sound Navy Yard, parts for airplanes (Schedule 900-1218); until Nov. 26, parts for airplanes (Schedule 900-1212) for San Diego Naval Station; until Nov. 23, motor-driven horizontal shaper (Schedule 2065), two valve reseating outfits (Schedule 2046) for Mare Island yard.

Orcas Power & Light Co., East Sound, Orcas Island, Wash., asks bids until Nov. 19 for two diesel engine-generator units and auxiliary equipment for power plant. T. C. Smith, Henry Building, Seattle, is consulting engineer.

Warren Boat Co., San Diego, Cal., has plans for new boat-building and repair works on waterfront, including one-story main shop, 100 x 100 ft., marine ways and other structures. Later shop will be extended to 100 x 250 ft. Cost over $75,000 with equipment. Frank L. Hope, Jr., San Diego Trust & Savings Building, is architect.

Fouch Electric Co., 417 N.W. Ninth Street, Portland, electric equipment and supplies, has let general contract to A. J. Bingham & Son, Couch Building, for one-story addition, 100 x 100 ft., for storage and distribution. Cost close to $40,000 with equipment. G. Pettingell, 1522 S.E. Twenty-ninth Street, is architect.

FOREIGN

Australian Paper Manufacturers, Ltd., Melbourne, Victoria, Australia, has plans for new pulp and paper mill on six-acre tract at Morwell, Victoria, with machine shop, power house and other mechanical structures. It will operate under a special process for production of pulp wood from eucalyptus. Mill is scheduled for completion late in 1938. Cost close to $3,500,000 with machinery.

Crosse & Blackwell, Ltd., Glasgow, Scotland, canned food products, plans new plant at Peterhead, Scotland, where site has been selected. Cost about $400,000 with equipment.

Sydney County Council, Sydney, New South Wales, Australia, asks bids until Dec. 2 for coal-handling plant for Bunnerong power plant (Specifications No. 171).

New Industrial Literature

WATER COOLING EQUIPMENT.—Binks Mfg. Co. Catalog covers various types of water cooling towers and industrial spray nozzles, and includes engineering data and other information of interest. Bulletin 11-24.

INSULATING MATERIAL.—Johns-Manville. Information on sheet, block and pipe insulations for service on various types of heated and refrigerated equipment is described in this booklet. Included is a section covering JM-20 insulating brick, which is designed for service against temperatures up to 2000 deg. F. Bulletin 11-25.

COPPER ANNEALING FURNACES.—Continental Industrial Engineers, Inc. Technical booklet discusses the application of the principle of controlled atmospheres to the annealing of copper and its alloys. Bulletin 11-26.

ASSEMBLY FITTINGS.—Groov-Pin Corp. Bulletin describes Groov-Pins and drive plugs designed to facilitate assembly operations. Pins are claimed to be six to eight times more shakeproof than ordinary taper plugs due to their construction features. Typical industrial applications are illustrated and engineering specifications are given. Bulletin 11-27.

PRESSES.—Niagara Machine & Tool Works. Bulletin covers Niagara horn presses, side seamers and sprue cutters. Presses feature a newly developed 14-point engagement clutch and may be equipped for direct motor drive. Complete specifications included. Bulletin 11-28.

STAINLESS STEEL ELECTRODES.—Page Steel & Wire Division, American Chain & Cable Co., Inc. Booklet contains considerable information regarding the various grades of stainless steel and the procedure for welding them. Bulletin 11-29.

CONVEYING EQUIPMENT.—Standard Conveyor Co. 44-page catalog contains data and illustrations pertaining to the application of conveying systems to steel mills and foundries. Prepared especially for operating and engineering executives. Bulletin 11-30.

HIGH TEMPERATURE—HIGH PRESSURE VALVES.—Hancock Valve division, Manning, Maxwell & Moore, Inc. Small valves for pressures up to 1500 lb. per sq. in. and temperatures up to 950 deg. F. are described in this bulletin. Valves have welded-on Stellite seat and are available in various types. Bulletin 11-31.

UNIVERSAL MOTORS.—The Dumore Co. Bulletin explaining the universal motor and describing its performance and construction. Contains list of points to consider in selection of motors and also includes diagrams and performance charts. Bulletin 11-32.

DIE AND MOLD DUPLICATORS.—George Gorton Machine Co. 31-page catalog describing machines for the duplication of die casting dies, plastic molds, drop forging dies and glass molds. Machine is illustrated and details pointed out. Specifications and diagrams are included as well as many illustrations of samples of machine's work. Bulletin 11-33.

DRAFT CONTROLS.—Shallcross Controls, Inc. Folder containing charts, diagrams and illustrations explaining and describing the value of draft control and details and operations of automatic draft control. Bulletin 11-34.

QUENCHING MACHINES.—G. S. Blakeslee & Co. Folder describing and illustrating spiral, oil or water quenching and washing machines for heat treated parts. Details and features are discussed. Bulletin 11-35.

PORTABLE HYDRAULIC PUNCH.—Hannifin Mfg. Co. Bulletin containing illustrations, descriptions and specifications of 17½-ton high-speed portable hydraulic punch for semi-automatic operation. Bulletin 11-36.

HEAVY DUTY WEIGHING.—Streeter-Amet Co. Bulletin describing and illustrating types of platform, track and motor truck weighers. Bulletin 11-37.

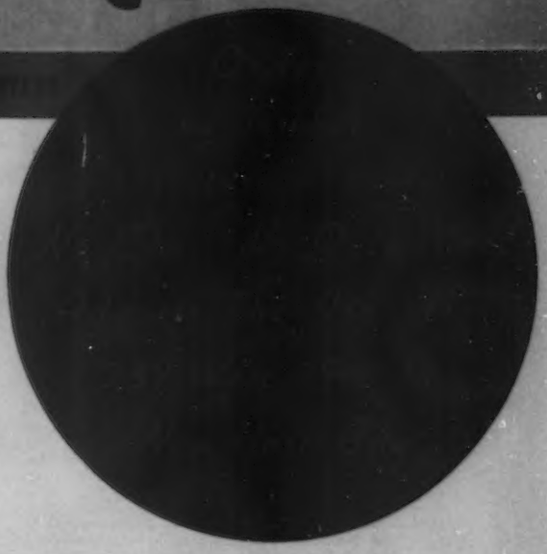
RESISTANCE WELDERS.—Armglo Co. Folder listing features of Armglo resistance welders including spot, flash and projection welders which operate on from five to 200 k.v.a. and are operated by foot, motor or air. Bulletin 11-38.

OILGEAR EQUIPMENT.—The Oilgear Co. Catalog containing full description of the Oilgear principle and application. Also contains complete technical information, illustrations and specifications on Oilgear broaching machines, presses, pumps, motors, variable speed transmissions, cylinders and intensifiers. Includes instructions for use of Oilgear equipment. Bulletin 11-39.

WELDING ELECTRODE MATERIAL.—P. R. Mallory, Inc. Folder illustrates the use of Elkaloy A as an electrode material for general resistance welding in the automobile industry. Material is said to last three to five times longer than copper tips, and to require fewer dressings. Bulletin 11-40.

EMBOSSING MACHINE.—Pannier Bros. Stamp Co. Bulletin describes metal tag embossing machine capable of embossing six single tags at one time. Lettering capacity is from six to nine lines, with from 24 to 27 characters per line. Simplicity of operation is claimed due to the application of the inter-meshed gear principle to the character wheels. Bulletin 11-41.

RUBBER BELTS.—Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc. Illustrated four-page bulletin on Condor compensated belts. In addition to describing the reasons for compensating belts, the bulletin explains in detail the advantages claimed for this type belt. Engineering data essential to the proper selection, application and supervision of belts are also included. Bulletin 11-42.



EXPLOSION- AND SPLASH-PROOF MOTORS.—Reliance Electric & Engineering Co. Bulletins 122 and 123 describe the construction features and operating characteristics of splash-proof and explosion-proof electric motors. Explosion-proof motors are approved by Underwriters' Laboratories, Inc., for use in class 1, group D hazardous locations. Bulletin 11-43.

PRESSURE AND COMBUSTION CONTROLS.—Askania Regulator Co. Bulletin describes in detail the application of pressure and combustion controls to soaking pits, open hearths, heating furnaces, etc., and includes condensed data for the solution of various flow problems. Bulletin 11-44.

VANADIUM STEEL CASTINGS.—Vanadium Corp. of America. Booklet contains a description of the properties and applications of a number of vanadium alloy steels for castings where high strength without excessive weight is required. Photographs of various castings of this nature are used to illustrate the text. Bulletin 11-45.

DRILL PRESSES.—Consolidated Machine Tool Corp. Bulletins 301, 200 and 125 illustrate and describe heavy duty manufacturing type and multiple spindle head type drill presses. General specifications and cut-away drawings showing internal construction features are included. Bulletin 11-46.

METAL SPRAYING.—Metalspray Co., Inc. Bulletin 800 covers some of the newer metal spraying applications, as building up beater rolls and printing press cylinders, and coating motors and various housing with non-corroding metals to prolong their life. Photographs show set-up methods and finished results. Bulletin 11-47.

Factory Equipment and Tooling In the Aircraft Industry

By D. M. CARPENTER
Consolidated Aircraft Corp.

THE most outstanding feature to be noted in connection with aircraft factory equipment and tooling is its general inadequacy. No one ever seems to have at hand quite the right item of equipment to handle the particular job under consideration, nor the tools to finish it in the minimum time, in the most efficient manner and with the minimum of cost.

Abstract of a paper presented at the National Aircraft Production meeting of the Society of Automotive Engineers at Los Angeles, Cal., Oct. 7 to 9.

Single purpose machinery is manifestly out of the question: universal adaptability is the watchword. Although we deplore the economic waste involved in operating a 10-ton punch press on jobs which the operator can almost bite out with his teeth, we must maintain the machine on the factory equipment list in order that it may be available for the occasional heavy job demanding its full capacity.

Manufacture of most aircraft parts may be boiled down to cutting, forming, fastening and finishing. Our outstanding contribution to the cutting process is a new square shear, designed by our Mr. Van Dusen. All square shears on the commercial market are rather cumbersome items of equipment—too slow to be considered efficient on small parts. This one has a 20-in. blade, can be adjusted from the front and can be set for continuous operation at about 140 strokes per min. Many small parts which might previously have justified a blanking die can be knocked out on this machine more rapidly than on a punch press —and without the die cost.

The drop hammer and hydraulic press serve to produce limited quantities of stampings with comparatively low die costs. Due to the fact that they can be turned out very rapidly, once the dies are made, stampings are becoming increasingly popular. It is advisable, however, to give careful consideration to *all* costs involved before becoming too enthusiastic. First cost, maintenance, amortization, set-up time, power consumption, etc., must be considered in computing the cost of stampings. Weight is another important consideration. Most important of all is the question of waste material. The flash which must be trimmed from stampings is no small item of cost.

We have found ways and means to put at least part of our scrap to good use. There are still many parts produced by hand from form blocks. These, cast from aluminum alloy scrap and finished to size, are

(CONCLUDED ON PAGE 140)

SUPERIOR
COATED SHEETS

To get the precise degree of temper . . . plus uniform coating so essential to accurate fit and quality workmanship with galvanized sheets, specify SUPERIOR. They have long been the first choice of shops specializing in quality work.

THE SUPERIOR SHEET STEEL CO., Canton, Ohio
Division of Continental Steel Corp., U. S. A.

5 MEN DO THE WORK OF 6

Tests show that on the average five men can do the work of six . . . not once in a while but every time, if they use Nicholson, Black Diamond or McCaffrey Files.

For the most exacting file tests ever devised show that these files are uniformly high in their ability to remove stock . . . that the performance of one represents faithfully the performance of thousands of dozens.

Now . . . while skilled labor shortage makes it necessary sometimes for five men to do the work of six, use the files that will help them do it *every time*. Nicholson, Black Diamond or McCaffrey . . . fastest cutting . . . uniformly high in performance. At Mill Supply Dealers'. Nicholson File Company, Providence, R. I., U. S. A.

A FILE FOR EVERY PURPOSE

THESE MANUFACTURERS

Our Analysis Service Will Show What You Can Save —COSTS YOU NOTHING

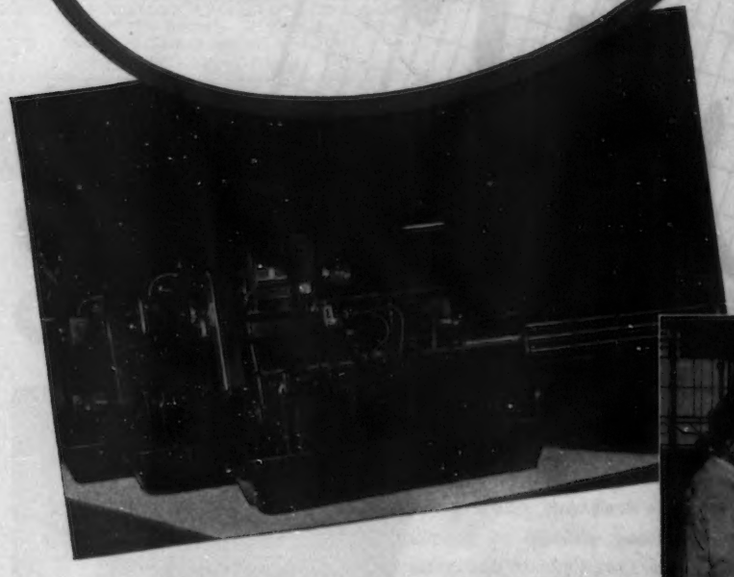
How recently have you compared the costs and productive profits of your present screw machines with current models?

On these two pages you see just a few examples of savings manufacturers have made with new National Acme Gridley Automatics. So many amazing improvements have been made in our machines that frequently it pays to replace machines only a few years old.

The new Model R has higher spindle speeds, takes heavier feeds, indexes faster, has splash lubrication. Vibration is lessened. Heavier throughout, the machines last longer.

You can easily find out what the Model R can save *you* without cost or obligation. We will send a competent engineer to survey your equipment. He'll submit specific recommendations and estimate savings. You have nothing to lose—all to gain.

Just write today to The National Acme Company, Cleveland, Ohio.



(*Above*) New National Acme Gridley 6-spindle automatics make 2 parts in 10 seconds as compared with 1 part in 14 seconds. The machines will pay for themselves in 18 months. —*Defiance Automatic Screw Company.*

(*Right*) "A recent study and examination of new machines on the market convinced us that we could obtain maximum precision with the Model R Acme Gridley Screw Machine. So successful has this been that we have since bought another of these machines."—*Robbins & Myers, Inc.*

Automatic Screw Machines
Dies and T
Positive Cen uges
The Chronolog
Contract Manufacturing

NATIONAL

MADE BIG SAVINGS

(*Above*) On the same screw machine parts new Model R machines do the work in 40% to 45% less time. —*Emsco Derrick & Equipment Co.*

(*Above*) Making socket blanks from SAE 4150 steel, a new Model R 6-spindle automatic screw machine is turning out parts three times faster than older machines running on the same type of work.—*Snap-On Tools, Inc.*

(*Above*) Machines have operated 24 hours a day for two years at 90% efficiency.— *Lincoln Engineering Co.*

(*Left*) Producing a connecting bolt requiring a smooth finish, freedom from burrs, accurate threads, the Model R has increased production 300% over old-type machines. —*Wagner Electric Corporation.*

REG. U.S. PAT. OFF.

ACME GRIDLEY AUTOMATICS

(CONTINUED FROM PAGE 136)

much more satisfactory than the steel-reinforced wood blocks formerly used. Built up forms can be made very satisfactorily from pieces sawn out of aluminum alloy slabs, cast about 2 in. thick. Cast channel section makes excellent drill jig material. Large tools and fixtures requiring frequent lifting and handling are much more satisfactory to the shops in the comparatively light cast aluminum alloy construction than when made from steel.

Angles and other drawn and extruded shapes must be bent to weird conformations. Angle sections are now wiped to acute angle bends impossible to the three-roll former. Air cylinder drive has been applied to the wipers. Our draw bench department recently disclosed a fact new to us; namely that metal may be formed in two directions simultaneously without tendency to failure whereas separate and successive operations were invariably troublesome. Strip stock is now fed into a set of rolls and dies which turn up the angle flange as an extra roll simultaneously puts the required curvature into the piece.

Spot welding is touted by some but general method of fastening aircraft parts together continues to be the rivet. Before one can insert rivets one must make holes. Before one can make holes they must be located. Drill jigs have been used for this purpose for years. Usually they are equipped with bushings. These are expensive and take time to install. A little trick worth trying is to drill the jig with one-quarter, three-eighths, or one-half inch holes as circumstances may demand and to attach the bushing to fit these holes to the drill. One bushing then serves for every hole in the jig; for that matter for any other jig requiring the same size bushing. This is a real time and money saver.

Layout and production of holes may be accomplished simultaneously by use of a gang punch on straight parts adaptable to the method. Experience in ship building has caused the Navy to forbid punching of holes to full size because of tendency to develop cracks. Laboratory examination of samples of punched holes produced in our factory shows them to be the equal of drilled holes in aluminum alloy. Hence we hope some day to be able to punch our work with full size holes. Even with present restrictions, however, we are making appreciable savings by accomplishing accurate layout and punching of pilot holes in one operation on all straight parts such as stringers, etc.

We have two rivet making machines, maintain a stock of rivet wire on hand and produce as many odd sizes as we find necessary without waiting for an outside vendor to serve our needs. One more machine is sadly needed—a satisfactory rivet sorter.

We drive as many as possible of our rivets by the squeezer method. Air squeezers are to be preferred to the hydraulic type because of their greater speed. With two helpers to insert rivets and prepare parts, one squeezer operator has set as many as 11,000 rivets in an 8-hr. day. If this speed could be maintained in all our riveting operations, spot welding as a method of fastening would be of far less interest than it now is.

Heat treatment of rivets merits special equipment to insure uniformity of results. Accordingly, we have designed and are building equipment for this purpose which will be fully automatic in its operation.

Navy specifications require that every piece of aluminum alloy used in airplane construction be anodized with the exception of electrical boxes and their accompanying conduit. This caused the anodic department to bottle-neck the plant until we recently doubled its former capacity. Even now, with two large tanks and two generators, we are running full capacity in the anodizing plant 16 hr. per day. Operation at this rate necessitates frequent changes of the chromic acid mix in order to maintain quality of product. This is costly. Just why the acid should deteriorate we do not know. Quite possibly there is a means of reclaiming it for further use. If so, a very welcome new item of equipment would be a reclaiming device to be installed in circuit with our anodizing tanks in order to reprocess the electrolyte continuously.

Modern Refractory Practice

THIS is the title of a handsome 300 page book, 9 in. by 12 in. in size, with a stiff, illustrated board binding, which is the second edition of this title issued by the Harbison-Walker Refractories Co., Pittsburgh.

In addition to describing and illustrating the various products of the company, this book contains much reference material of use to those having to do with high temperature operations and includes considerable suggestive material relating to the application of refractories in various industries.

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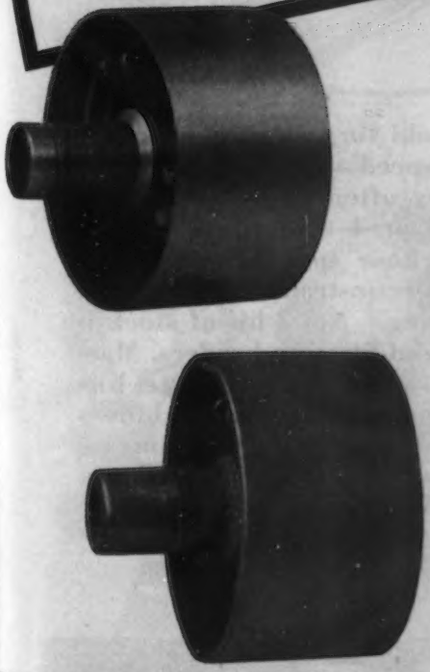
20,000 PULLEYS A YEAR!

with GISHOLT SIMPLIMATICS



The machining of these 13" x 6½" belt pulleys takes only 11 minutes from floor to floor and includes these operations: Turn and face hub outside diameter—turn outside diameter and crown—turn and face rim—cut snap ring groove in hub.

● If it's speed and low cost production you're looking for, then look to the Gisholt Simplimatics. Here's a nationally known manufacturer that knows the economy of modern equipment and modern methods. Two operators, tending four Gisholt Simplimatics, turn out belt pulleys to the tune of 20,000 a year. They do it with less effort, in less floor space, in less time than is possible by any other method. This high production economy is made possible by these outstanding features, found only in Gisholt Simplimatics:

★ The design of the machine which permits simultaneous cutting of all possible surfaces of the piece being machined.

★ Heavy, rigid construction to withstand the pressure of multiple tooling without vibration or distortion.

★ Maximum tool life because the tools are rigidly supported with a minimum overhang. Tools are held in blocks on adjustable slides which bring the tools close to the work.

★ Ease and simplicity of operation—no physical effort on the part of the operator. One operator can tend two or more machines.

★ Simple, automatic high production lathe combining dependability with low maintenance cost.

Any Gisholt man will gladly explain the cost-saving features of these new Gisholt Simplimatics. An interview may lead to the saving of many thousands of dollars.

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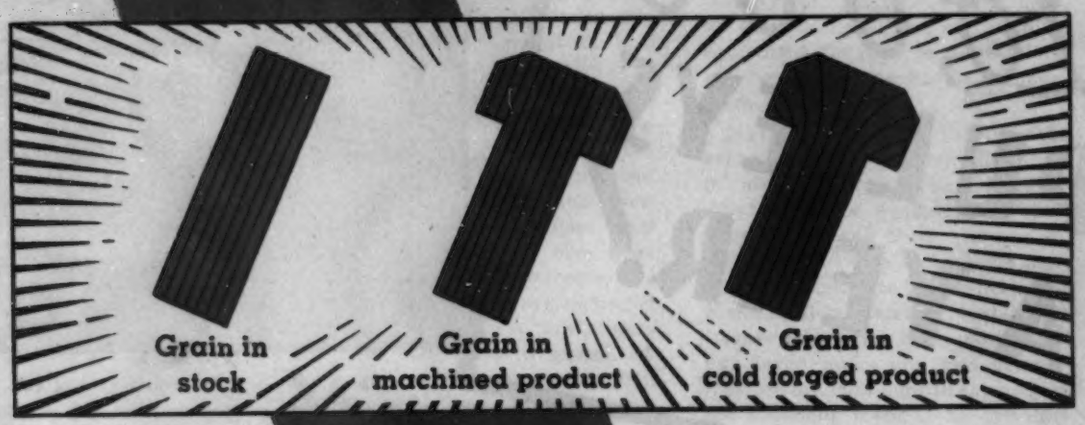
TOUGHER grain structure in Cold Forged products



Cold forging has other advantages besides 20% to 75% lower cost of production. Small parts turned out via cold forging usually have greater strength. Other methods cut the grain off clean. The lines of grain flow are straight and unsupported. When blanks are cold forged in a Manville Header the grain "fans out" in the head and projections. The result is an arched or whorled grain structure which is far stronger.

Manville cold forging machines give you high-speed automatic production. They often boost production speed 2, 3 or 4 times . . . without increasing floor space or overhead. They use wire instead of bar stock—a 14% saving. Not a bit of stock is wasted. In addition to headers, Manville manufactures a complete line of automatic cold forging machinery including: Bolt Head Trimmers, Screw Thread Rollers and Screw Slotters. Write for information.

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COLD FORGING
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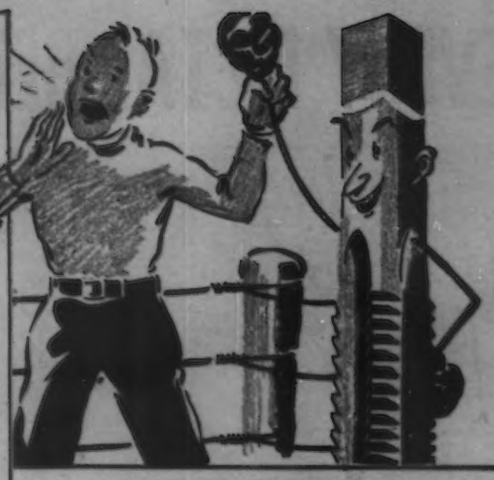
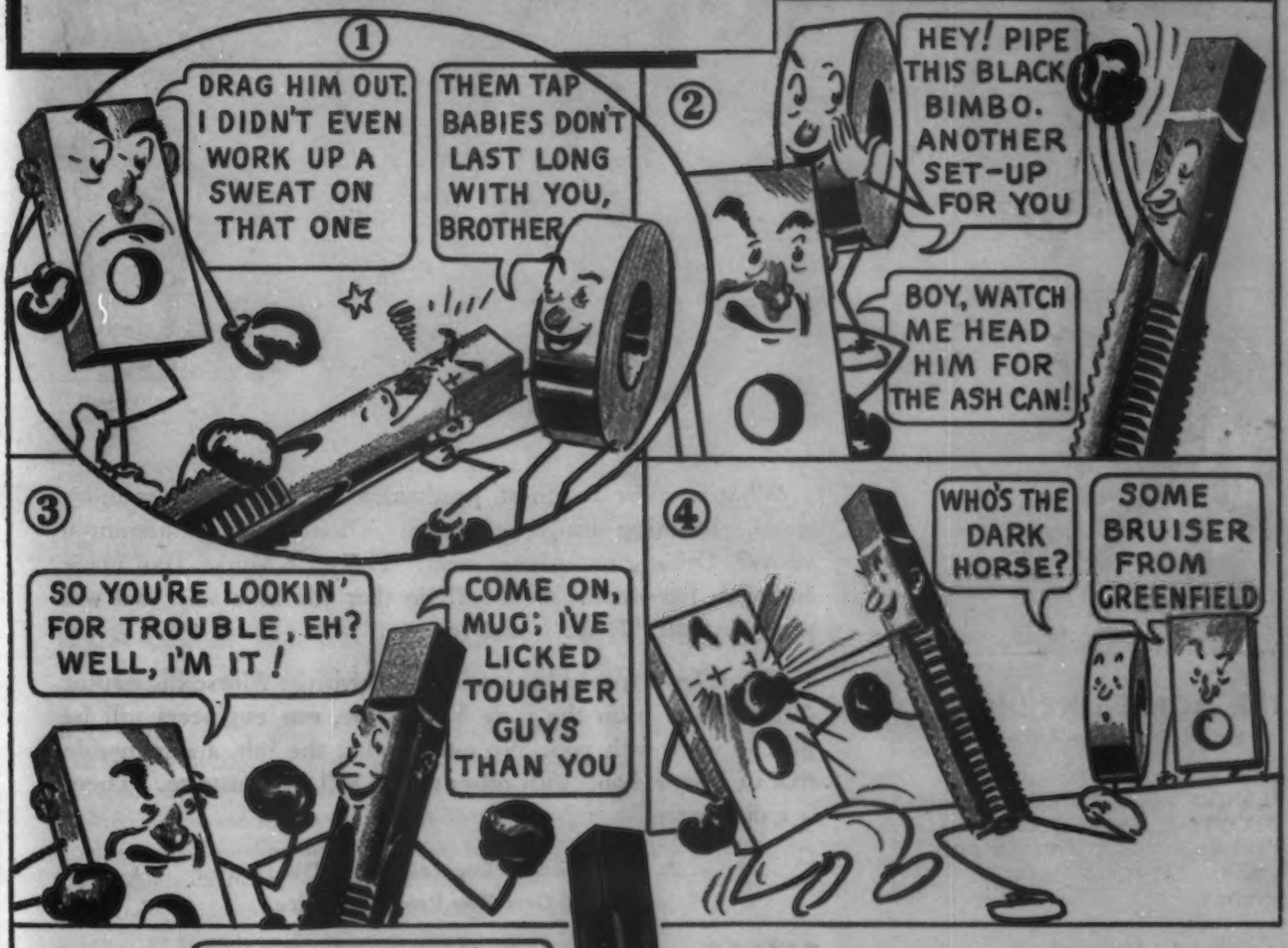
"MAXI" WINS BY KNOCKOUT

DUSKY NEWCOMER VICTOR IN WHIRLWIND BATTLE




1
DRAG HIM OUT. I DIDN'T EVEN WORK UP A SWEAT ON THAT ONE
THEM TAP BABIES DON'T LAST LONG WITH YOU, BROTHER
2
HEY! PIPE THIS BLACK BIMBO. ANOTHER SET-UP FOR YOU
BOY, WATCH ME HEAD HIM FOR THE ASH CAN!
3
SO YOU'RE LOOKIN' FOR TROUBLE, EH? WELL, I'M IT!
COME ON, MUG; I'VE LICKED TOUGHER GUYS THAN YOU
4
WHO'S THE DARK HORSE?
SOME BRUISER FROM GREENFIELD
5
FROM NOW ON, I'M RUNNING THIS JOINT. ANY ARGUMENT?
OKE BY ME!
WHAT YOU SAY GOES

"Maxi" taps, twist drills and reamers have always "licked" tough production jobs wherever they have been used. Give them a chance in your own plant and profit from their increased efficiency and longer life.

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If you have special requirements which the Morse distributor cannot meet from the wide Morse line, our engineers will be glad to work with you. No matter what the job, a side-by-side trial of Morse Tools with other makes will demonstrate, "There is a difference."

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WHETHER your surfacing operations are intermittent, or on a continuous production schedule—whether they involve surfacing metal, wood, stone, concrete, tile—there's a Black & Decker Portable Sander that will improve production time and results. The popular 7-Inch Special Sander (illustrated) is a standard production model with a wide variety of applications. Also there is the 7-Inch Junior for "odd-job" use; the 7-Inch Heavy Duty for high speed mass production; the 9-Inch Standard for large areas; and the extra heavy duty Electric Surfacer for the most severe types of surfacing work. Ask your Black & Decker Jobber for a demonstration, or write for catalog. The Black & Decker Mfg. Co., 751 Pennsylvania Ave., Towson, Maryland.

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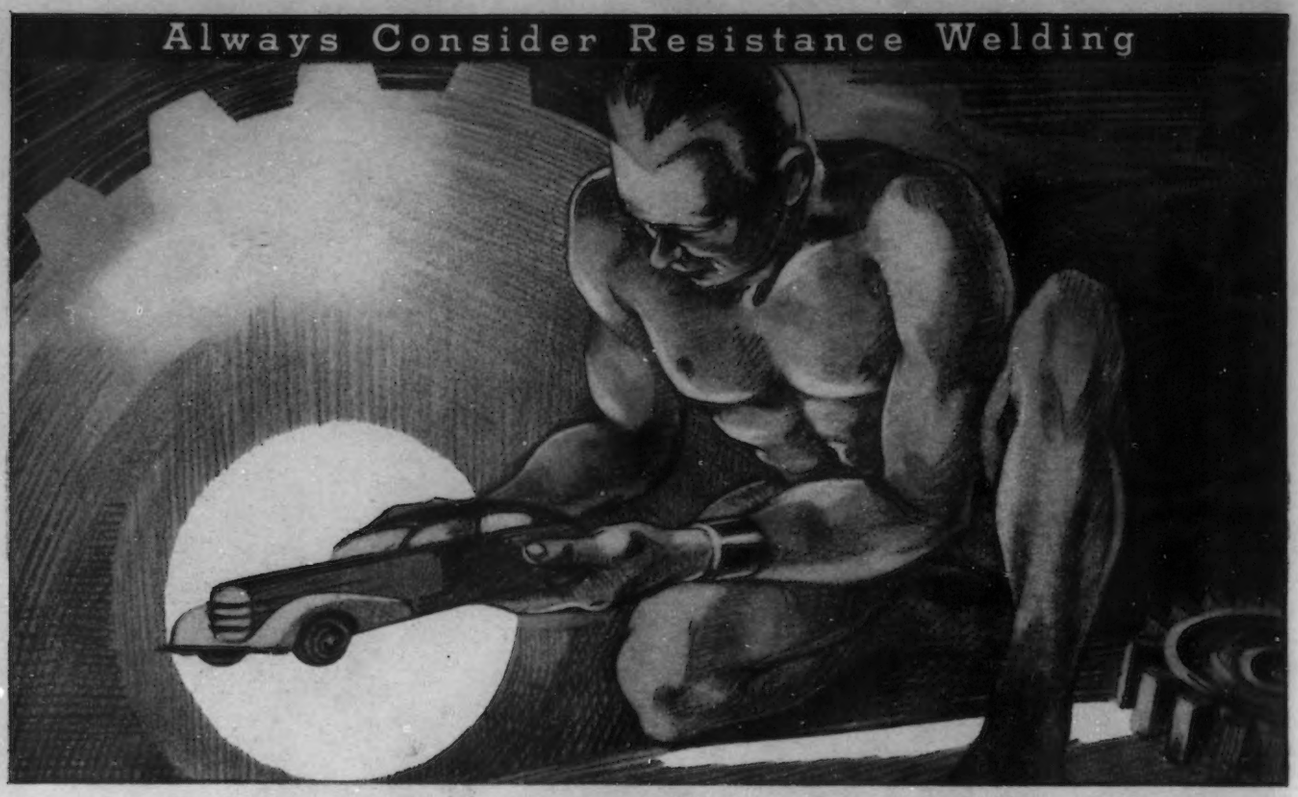
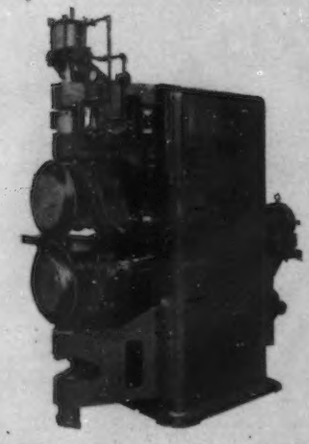


RESISTANCE WELDING PUTS *Strength* INTO THE ASSEMBLY



This Federal Resistance Welder unites special roof bow sections for one of the world's finest makes of automobiles. Work passes through at speeds up to 100 feet per minute. Control panel interrupts current, making a succession of spot welds at intervals of 2" more or less as desired. Welding discs are 18" in diameter with special roller bearings. Pressure controlled by a double acting air cylinder. Welder can be driven by rolled section from rolling equipment if desired, and is rated at 450 KVA, weighing 8,000 lbs. complete.

● Where great strength is an essential factor in assembly . . . there you will find Resistance Welding . . the fusing of metal to metal by electricity . . . performing a giant's task . . . . doing it more quickly . . . more efficiently . . . and more economically.

In the automotive industry, for example, where greatest strength is demanded in a connection, Resistance Welding unites body and machine parts to withstand extreme stress and strain. Similarly it enters into the assembly of railroad equipment, airplanes, amusement devices and countless other machines where the element of safety . . . the guarding of human lives . . . must be taken into consideration.

In the metal working field, welding equipment is now of even greater importance than the machine tool as a piece of production equipment. Its use is daily becoming more general as its possibilities become more widely understood and appreciated. Engineering executives, in an ever increasing number, are specifying Resistance Welding, convinced of its superior strength over any other type of connections.

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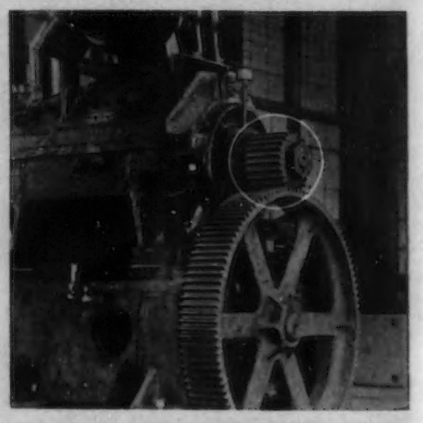
IN construction equipment exposed to rough service, weather and atmospheric grit, Bakelite Laminated silent gears and pinions provide maintenance economy. Inserted in the gear train, they eliminate metal-to-metal contact, cut down dust-abrasion, and reduce wear on costly metal gears.

In mill and factory machines, also, Bakelite Laminated gears furnish this valuable economy, *plus* important benefits to production speed and costs. By cushioning the impacts of meshing teeth, they silence the nerve-wracking noise that often decreases the efficiency of every operator within ear-shot.

Bakelite Laminated gears are used today in a wide variety of equipment, from light, high-speed machines to heavy rolling mills. They are unaffected by moisture, fumes, oil and alkalies. Write for detailed illustrated booklet 2L, "Bakelite Laminated."



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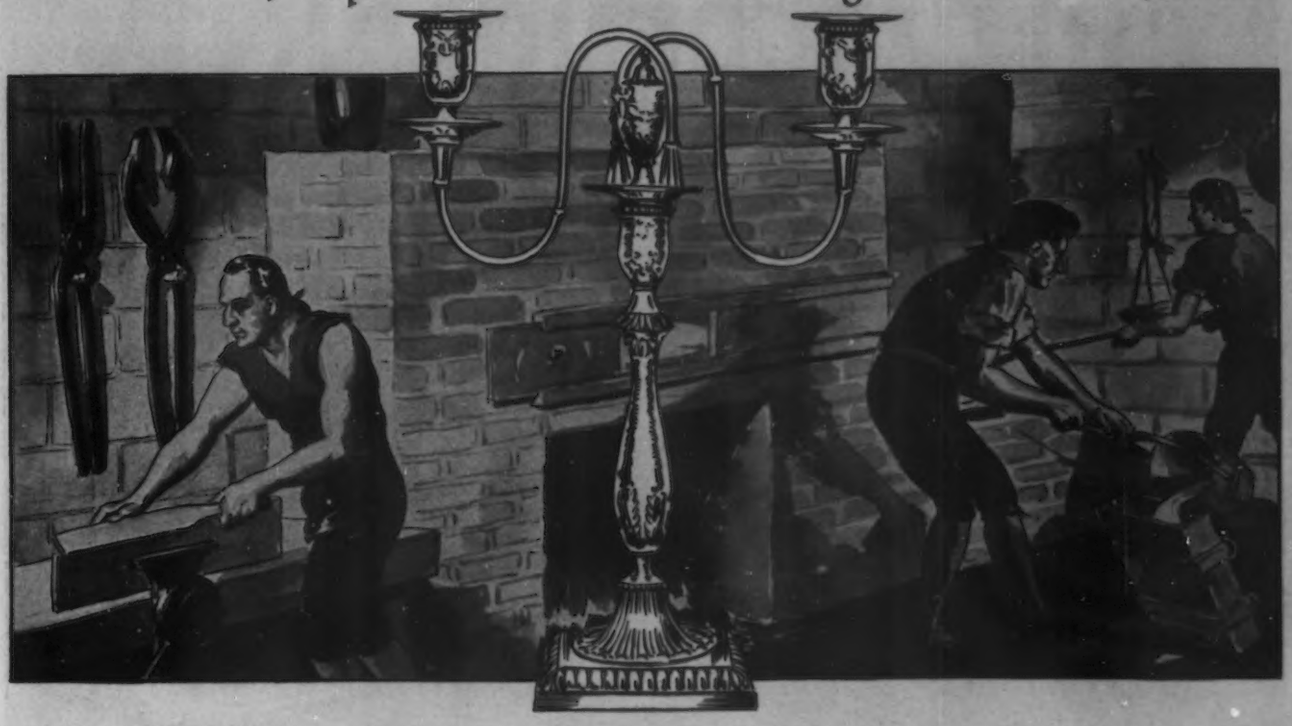

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Sheffield plate, in addition to presenting manufacturing advantages, met three important requirements at the time of its discovery, about 1742. Its appearance was attractive. It lowered the costs of the products into which it was worked to a point within reach of new markets. And it provided a means of surmounting competition in the profitable markets which already existed.

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Car driven by Ab Jenkins photographed while breaking 36 "unlimited" and 36 "Class C" stock closed car records—all well above 100 m.p.h. For 24 hours he averaged 101.72 m.p.h.

Ab Jenkins sets 159 new speed records.... using Gulfpride Oil and No-Nox Ethyl Gasoline

(Supervised and timed by the Contest Board of the American Automobile Association)

NO special lubricants or fuels were used by Ab Jenkins when he recently hung up 159 new speed records with his big racer and his stock car sedan on the Bonneville salt beds in Utah.

He used the same Gulfpride Oil and Gulf No-Nox Ethyl Gasoline that are giving thousands of car owners new motoring economy and satisfaction every day! *The same gas and oil you can buy for your car from any Gulf dealer!*

Gulfpride Oil has unique qualities which make it an ideal lubricant for all operating conditions. It is refined by a special process — Gulf's exclusive and patented Alchlor process — which removes 20% more waste, carbon, gum and sludge-forming elements. The result is an oil of greater stability, greater resistance to oxidation, better lubricating qualities and longer life.

This same refining process is used in the preparation of Gulf's finest industrial lubricants. Thus, operators of steam turbines, air compressors, Diesel engines and many other types of industrial equipment can secure for their engines and machines the same protection against friction, wear and repair expense that Ab Jenkins received from Gulfpride Oil when he made 159 new speed records in Utah. GULF OIL CORPORATION · GULF REFINING COMPANY, GENERAL OFFICES, PITTSBURGH, PA.

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REPORTING ON

ZINC ALLOY DIE CASTINGS

-IN 2 MAJOR CONSUMING FIELDS

To attempt to illustrate the growth of the die casting industry within a single year is a man-sized job. Because of the number of industries in which ZINC Alloy Die Castings are now utilized, no one picture book, however comprehensive, could possibly illustrate the maze of products in their full scope.

It is proposed, therefore, to treat each industry separately. The first two books on ZINC Alloy Die Castings—in Electrical Equipment and in Business Machines—have just come off the presses. The many examples of complete assemblies of ZINC Alloy Die Castings shown in these books will be of exceptional interest to the man who is active in the development and fabrication of metal products—whether or not he is directly associated with the industries covered in the books.

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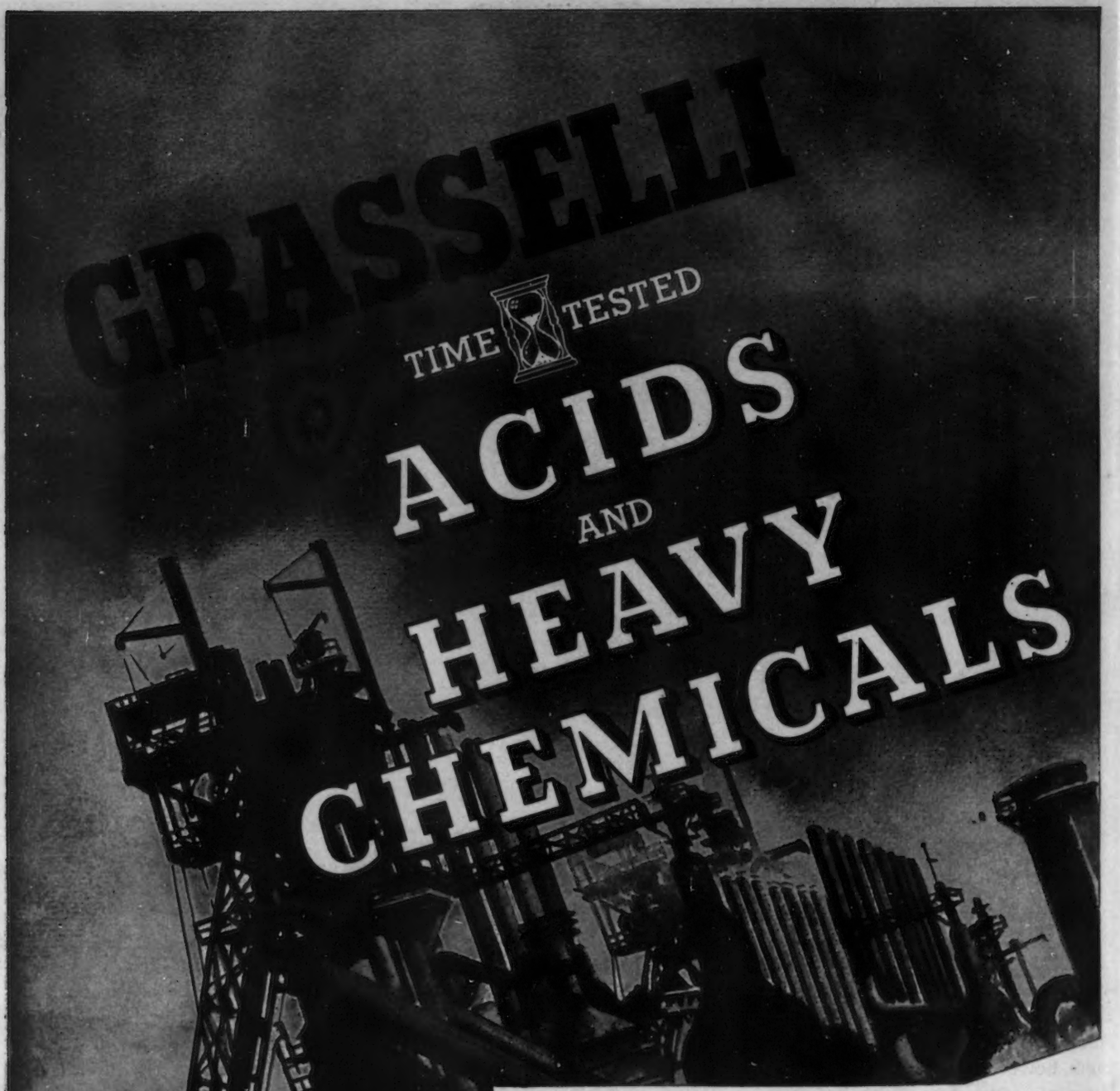

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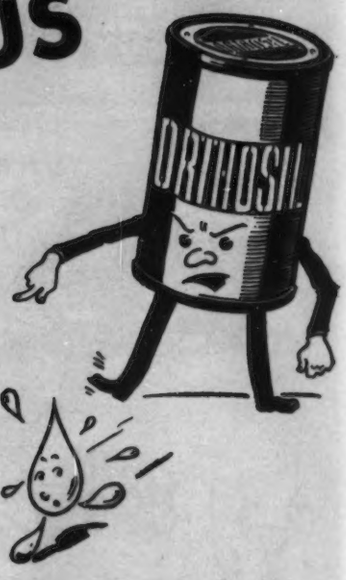

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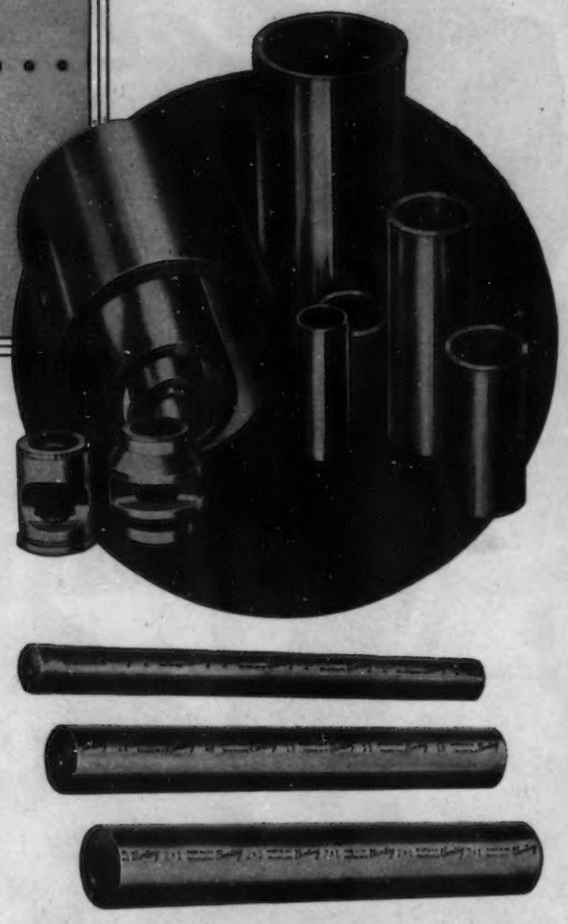

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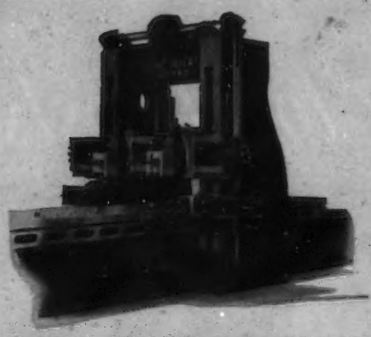

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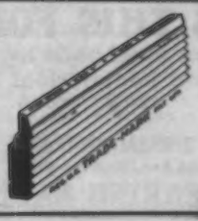

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Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

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Hartford (Conn.) Steel Ball Co., The.
Ransohoff, N., Inc., Cincinnati.
Whiting Corp., Harvey, Ill.

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Republic Steel Corp., Cleveland, Ohio.

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Aluminum Co. of America, Pittsburgh.

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Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

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USL Battery Corp., Niagara Falls, N. Y.

BATTERY CHARGERS
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Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BEARINGS—Ball
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Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

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Schatz Mfg. Co., Poughkeepsie, N. Y.

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National Bearing Metals Corp., Pittsburgh.

BEARINGS—Oilless
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Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
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Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

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Timken Roller Bearing Co., The, Canton, O.

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Richardson Co., The, Melrose Park, Ill.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
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BEARINGS—Self-aligning Roller
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Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

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Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENDING MACHINES—Hand, Band and Angle
Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Kane & Roach, Inc., Syracuse, New York.
Niagara Machine & Tool Works, Buffalo, N. Y.

BENZOL RECOVERY PLANTS
Koppers Co., Pittsburgh.

BERYLLIUM COPPER
American Brass Co., The, Waterbury, Conn.

BILLETS—Chrome Nickel Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Chrome Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.

BILLETS—Steel
Bethelhem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BIMETAL—Thermostatic
Chace, W. M., Co., 1605 Beard Ave., Detroit.

BINS—Rotating
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Richardson Co., The, Melrose Park, Ill.

BLANKS—Gear, Silent Steel
Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES
Brassert, H. A., & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. S., Co., 50 Church St., N. Y. C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
North American Mfg. Co., The, Cleveland.
Spencer Turbine Co., Hartford, Conn.

BLOWPIPES—Oxy-Acetylene Welding & Cutting
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

BLOWPIPES — Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N. J.
Weldit Acetylene Co., Detroit.

BOILERS
Munroe E., & Sons Mfg. Corp., Pittsburgh.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOLT CUTTERS
Acme Machinery Co., Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.

BOLT AND NUT MACHINERY
Acme Machinery Co., Cleveland.
Ajax Mfg. Co., The, Euclid, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

BOLT & RIVET CLIPPERS
Bremil Mfg Co., Erie, Pa.
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

JUST BETWEEN US TWO

Denies Girl Was Offside

THE girl in the Goodrich ad on page 7 of the Oct. 7 IA, at whose croquet grip and stance we sneered, is defended by Ken Akers of the Griswold-Eshleman advertising agency which prepared the ad:

". . . the manufacturer tells us this new rubber croquet mallet should be used with a golf club grip as the game is a faster and a more skillful one because of rubber."

Not to mention, in mixed doubles, a less accurate one because of the temptation to rubber. We said, too, that she was playing from the wrong side of the court, and he says:

"Maybe somebody knocked her out of line and she is just getting back. Or maybe she was just led astray. Anything can happen these days."

As Goodrich is an important advertiser and Griswold-Eshleman an important agency, we admit that the criticism was captious. We will go further: when a girl with such graceful gams plays in shorts, who cares about the grip, stance or even the score itself? In fact you're lucky if you can even see the ball.

No. 1 Advertiser

WE yield to no one in our belief in the potency of advertising, but if we had to yield to anyone, it would be to Mr. Wrigley, who advertises his chewing gum in Vogue.

Orchid

WITH advertising volume and circulation rising comfortably so far, we cannot conscientiously disagree with A. K. Camens of Eastern Steel Products, Ltd., Montreal, who says, after patting our National Metal Show Number on its fat backbone:

"It seems to me The Iron Age has shown steady improvement in the past three years."

Ritzed by Junkmen

ONE size 7⅝ laurel wreath for the brow of the editor who wrote this lively head, *"Britain Peers into Garbage Pails to Get Scrap for Steel Industry."*

Which reminds us that during the summer, when the hunger for scrap was reported to be reaching famine proportions, we carefully accumulated a respectable pile of it, maybe twenty or thirty pounds, to do our bit to relieve the shortage and at the same time turn an honest penny. We thought that the active demand and high prices would bring the oldtime junkmen out of their long hibernation. But they scorned us.

Tops in His Eyes

NOT being up on such things, this column couldn't say, but a reader who has a weakness for composite indexes of industrial activity and who has tried most of them, tells us that the index of capital goods activity, whose fluctuations confront you weekly in this family paper (see page 59), is the best of its kind.

Stoppers

A *GENTLEMAN by Breeding—But a Mug at Heart*—Phosphor Bronze Smelting Co.

A salute, too, to R. K. LeBlond for that eye-catching illustration on page 67 of last week's issue.

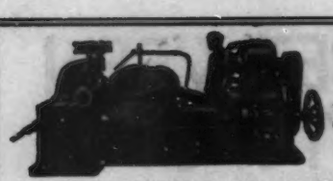
Desk Sanum, Mens Sana

AS one whose desk usually looks like the back bedroom floor just before the amateur wall paperhanger finished the border, we stared long and enviously at the virgin desk of R. F. Frenger, who heads the new Westinghouse plant at Lima, Ohio. See picture on page 31 of Oct. 21 IA. Not a single document mars its surface.

We have tried several times to ride our desk bareback but have always slipped off. The unfinished stuff crammed into the top drawer came back to haunt us a week later. Besides, the Oberleutnant always looked at us suspiciously when our desk top was bald and we were concentrating like anything on the International Business Machines' motto, *"Think!,"* which is stuck up on the wall.

Maybe Mr. Frenger will tell us what the trick is, but if there's a catch in it like cleaning up the day's work before leaving, don't bother.

—A.H.D.



Cutting Off Machines for Sawing All Kinds of Metals

THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.

THE CLEVELAND STEEL TOOL CO.
Punches. Dies. Chisels. Rivet Sets
660 E. 82nd St. Cleveland, O.
If it's RIVETED you KNOW it's safe

KEEP YOUR DRILLS IN A
DRILL—INDEX
MADE LIKE A CARD INDEX
A Flip of Wrist Opens or Closes
Made in Six Sizes
ASK YOUR DEALER OR WRITE TO
HUOT MFG. CO., 500 Robert Street, ST. PAUL, MINN.

Famous for quality of threads they produce, long life of chasers and all-around dependability.
Following literature available:
Bulletin on H & G General Purpose Die Heads.
Bulletin on new Insert Chaser Type of Die Head.
Bulletin on H & G Threading Machines.
See our Advt., page 220, April Machinery.
The Eastern Machine Screw Corp.
21-41 Barclay Street, New Haven, Conn.
Los Angeles: A. C. Behringer, 312 Commercial St., Los Angeles, Cal. San Francisco: Guy Reynolds, 464 Vernon St., Oakland, California.

Die Heads

With NICHOLSON EXPANDING MANDRELS
you have available for immediate use internal chucks for holding any hurry-up break-down job that comes along. Can be used on lathes, grinders, shapers or millers. Take any bores ½" to 7" Made in fourteen sizes. Bulletin 530.
W. H. NICHOLSON & COMPANY
165 OREGON STREET, WILKES-BARRE, PENNA.

LITTELL for FASTER PRODUCTION
AUTOMATIC CENTERING REELS

SPEED-UP output with Littell Automatic Centering Reels! Heavy coils loaded and centered by one man within a few minutes! Automatic centering arms. Confining arms and stock support. Ball bearings. Hand or automatic feeding. Three sizes, for 300, 600 and 1000-lb. coils. Plain or motor driven.
Ask for Circular 5-B
F. J. LITTELL MACHINE CO.
4151 Ravenswood Ave. CHICAGO, ILL.

Products Index

BOLTS—Special
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Special, Hot or Cold Upset
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.

BOLTS—Stove
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Upson Nut Div., Cleveland, O.

BOLTS AND NUTS
Ames, W., & Co., Jersey City, N. J.
Clark Bros. Bolt Co., Millidale, Conn.
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS AND NUTS—Self-Locking
Lamson & Sessions Co., The, Cleveland, O.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., N. Y. C.

BOOTHS—Spray
DeVilbiss Co., The, Toledo, Ohio.

BORING BARS
Bullard Co., The, Bridgeport, Conn.

BORING, DRILLING & MILLING MACHINES—Horizontal
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond Ind.

BORING & DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

BORING MACHINES—Diamond & Carbide Tools
Heald Mch. Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.
Rogers Machine Wks., Alfred, New York.

BOX STRAPPING
Acme Steel Co., Chicago, Ill.

BRAKE LINING AND BLOCKS—Asbestos
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BRAKES—Electric
Cutler-Hammer, Inc., Milwaukee.

BRAKES—Electric & Mechanical
Clark Controller Co., The, Cleveland.
Electric Controller & Mfg. Co., The, Cleveland.

BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

BRAKES—Metal Forming
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Peck, Stow & Wilcox Co., The, Southington, Conn.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Steelweld Machinery Co., Cleveland.

BRAZING—Electric
Metal Electric Processing Co., The, Toledo, Ohio.

BRICK—Acid Resisting
Keasbey Brick Co., Steubenville, Ohio.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.
Keasbey Brick Co., Steubenville, Ohio.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BRIDGE BUILDERS
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BRIQUETS—Ferroalloy
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

BROACHING MACHINES
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
Ampco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

BRUSHES—Machine
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BUCKETS—Clamshell
Blaw-Knox Co., Pittsburgh.
Hayward Co., The, 50 Church St., N. Y. C.
Industrial Brownhoist Corp., Bay City, Mich.

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES
Packer Machine Co., The, Meriden, Conn.

BUFFING APPLICATORS—Automatic
Packer Machine Co., The, Meriden, Conn.

BUILDINGS—Factory
Ferguson, H. K., Co., The, Cleveland.

BUILDINGS—Steel
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.
Bethlehem (Pa.) Steel Co.
Blaw-Knox Co., Pittsburgh.
Ferguson, H. K., Co., The, Cleveland.
Iron & Steel Products, Inc., Chicago.

BULLDOZERS
Ajax Mfg. Co., The, Euclid, Ohio.
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Steelweld Machinery Co., Cleveland.

BULLDOZERS—Hydraulic
Elmes, Chas. F., Engng. Wks., Chicago.

BURNERS—Oil or Gas
North American Mfg. Co., The, Cleveland.
Wilson, Lee Engineering Co., The, Cleveland.

BUSHINGS—Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Lawrenceville Bronze Co., Pittsburgh.
Phosphor Bronze Smelting Co., The, Phila.
Shenango-Penn Mold Co., Pittsburgh.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.

BY-PRODUCTS COKE AND GAS OVENS
Koppers Co., Pittsburgh.

CABINETS—Stock
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

CABLE—Electric
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland.

CABLEWAYS AND TRAMWAYS—See Tramways.

CADMIUM
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

CADMIUM PLATING PROCESS
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

CALCIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CALCULATING MACHINES
Monroe Calculating Machine Co., Inc., Orange, N. J.

CARBIC
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBURIZING BOXES
Electro Alloys Co., Elyria, Ohio.

CARBURIZING—See Heat Treating

CARS—Railway
Iron & Steel Products, Inc., Chicago.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.
Bartlett, C. O.-Snow Co., The, Cleveland.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
Ampco Metal, Inc., Milwaukee, Wis.
Duriron Co., Inc., The, 433 N. Findlay St., Dayton, Ohio.
Electro Alloys Co., Elyria, Ohio.
Hoskins Mfg. Co., Detroit, Mich.
Lebanon (Pa.) Steel Foundry.
Midvale Co., The, Nicetown, Phila., Pa.
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Alloy Iron
Forging & Casting Corp., The, Ferndale, Mich.
Weatherly (Pa.) Foundry & Mfg. Co.

CASTINGS—Alloy Steel
Bissett Steel Co., The, Cleveland.
Dodge Steel Co., Philadelphia, Pa.
Electro Alloys Co., Elyria, Ohio.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

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CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.
Fairmount Foundry, Inc., Phila., Pa.

CASTINGS—Brass, Bronze, Copper or Aluminum
Cadman, A. W., Mfg. Co., Pittsburgh.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.
Phosphor Bronze Smelting Co.,The, Phila.
Snyder, W. P., & Co., Pittsburgh.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Electro Alloys Co., Elyria, Ohio.
Meehanite Metal Corp., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Crucible Steel Castings Co., Lansdowne, Pa.
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Lebanon (Pa.) Steel Foundry.

CASTINGS—Gray Iron
American Engineering Co., Philadelphia.
Cheney, S., & Son, Manlius, N. Y.
Commercial Steel Casting Co., Marion, Ohio.
Fairmount Foundry, Inc., Phila., Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lane Mfg. Co., Montpelier, Vt.
Midvale Co., The, Nicetown, Phila., Pa.
Murray Iron Wks. Co., Burlington, Iowa.
National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.) Mach. Co., Inc.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—High Test & Alloy Iron
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

CASTINGS—Malleable
Baltimore (Md.) Malleable Iron & Steel Casting Co.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.
Malleable Iron Fittings Co., Branford, Ct.
Peoria (Ill.) Malleable Castings Co.

CASTINGS—Meehanite Metal
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Monel & Nickel
Superior Bronze Corp., Erie, Pa.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Steel
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Commercial Steel Casting Co., Marion, Ohio.
Crucible Steel Castings Co., Lansdowne,Pa.
Dodge Steel Co., Philadelphia, Pa.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Malleable Iron Fittings Co., Branford, Ct.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

CASTINGS—Wear Resisting
Meehanite Metal Corp., Pittsburgh.

CEMENT—Acid-Proof
Atlas Mineral Products Co. of Pa., The, Mertztown, Pa.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CEMENT—Quick Setting, Acid Proof & Insulator
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.
Johns-Manville Corp., 22 East 40th St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

CEMENT—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Webster Mfg. Co., Chicago.

CHAINS—Portable
Barrett-Cravens Co., Chicago, Illinois

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Webster Mfg. Co., Chicago.
Whitney Chain & Mfg. Co., Hartford, Ct.

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Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co. Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

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Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Industrial
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., New Britain, Conn.
National Acme Co., The, Cleveland.

CHUCKS—Air Operated
Hanniffin Mfg. Co., Chicago.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Cushman Chuck Co., Hartford, Conn.
Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Magnetic
Heald Mch. Co., Worcester, Mass.
Taft-Peirce Mfg. Co.,The,Woonsocket,R.I.

CIRCLES—Phosphor Bronze
Phosphor Bronze Smelting Co.,The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Detroit Rex Products Co., Detroit, Mich.
Ford, J. B., Co., The, Wyandotte, Mich.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.
Pennsylvania Salt Mfg. Co., Phila., Pa.

CLEANING COMPOUNDS—Alkali
Detroit Rex Products Co., Detroit, Mich.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING EQUIPMENT—Metal
Detroit Rex Products Co., Detroit, Mich.

CLEANING EQUIPMENT (Metal)—Electro-Chemical
Bullard Co., The, Bridgeport, Conn.

CLEANING MATERIALS—Glass
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CLOTHING—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

CLUTCH-BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Medart Co., The, St. Louis, Mo.
Morse Chain Co., Ithaca, New York.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., Milwaukee.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

COAL
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Koppers Coal Co., Inc., The, Pittsburgh.
Pickands Mather & Co., Cleveland.

COAL, ORE AND ASH HANDLING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.
Webster Mfg. Co., Chicago.

COBALT METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Pickands Mather & Co., Cleveland.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Pittsburgh.

COKE OVENS—By-Products
Koppers Co., Pittsburgh.

COKE OVENS—Cross Regenerators
Koppers Co., Pittsburgh.

COKE OVENS—With Recovery of By-Products
Koppers Co., Pittsburgh.

Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work.
MULTIPLE PUNCH
Capacity 1/2" holes in 1/4" plate
PITSCH & CO.
Indiana

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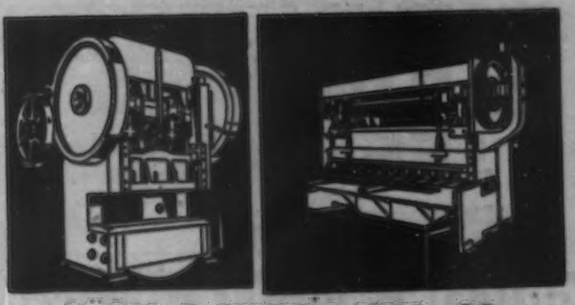
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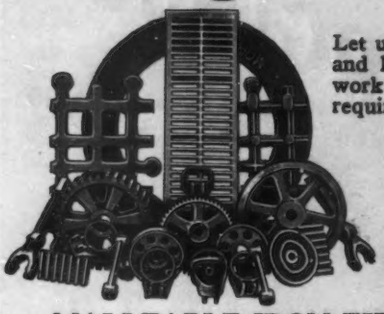
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Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
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Wood, R. D., & Co., Philadelphia.

INGOT MOLDS
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.
Valley Mould & Iron Corp., Hubbard, Ohio.

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INGOTS—Aluminum
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

INGOTS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc. Grasselli Chemicals Dept., Wilmington, Del.

INSTRUMENTS—Electric
Weston Electrical Instrument Corp., Newark, N. J.

INSTRUMENTS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

INSULATION
Johns-Manville Corp., 22 East 40th St., New York City.

IRON—Rustless
Ludlum Steel Co., Watervliet, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LAGGING—Insulating
Quigley Co., Inc., 56 West 45th St., N. Y. C.

LAMPS—Filament
General Electric Co., Cleveland.

LAMPS—Mercury Vapor
General Electric Vapor Lamp Co., Hoboken, N. J.

LAPPING MACHINES
Cincinnati (Ohio) Grinders Incorporated.

LATHES—Automatic
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Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Goss & De Leeuw Mch. Co., New Britain, Conn.
Jones & Lamson Mch. Co., Springfield, Vt.
LeBlond, R. K., Mch. Tool Co., Cincinnatti.
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Automatic Vertical
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.

LATHES—Bench
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rivett Lathe & Grinder, Inc., Boston, Mass.

LATHES—Brass
Warner & Swasey Co., The, Cleveland.

LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Contour Turning
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Crankshaft
LeBlond, R. K., Mch. Tool Co., Cincinnati.

LATHES—Engine
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

LATHES—Roll
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pitgh.

LATHES — Second-Hand. (See Clearing House Section)

LATHES—Toolroom
LeBlond, R. K., Machine Tool Co., Cincinnati, Ohio.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

LATHES—Turret
Acme Machine Tool Co., Cincinnati.
Bardons & Oliver, Cleveland.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES, Turret, Vertical
Bullard Co., The, Bridgeport, Conn.
Rogers Machine Wks., Alfred, New York.

LAYOUT FLUID
Dayton Rogers Mfg. Co., Minneapolis, Minn.

LEAD LININGS
Dietzel Lead Burning Co., Pittsburgh.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEGGINS—Safety
Safety Equipment Service Co., Cleveland.

LEVELING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Wean Engineering Co., Inc., The, Warren, O.

LINING—Converter
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
Davenport (Iowa) Locomotives Works.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gasoline
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Gas-Electric
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Industrial
Davenport (Iowa) Locomotives Works.
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Steam
Iron & Steel Products, Inc., Chicago.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Gear
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—High Pressure & Temperature
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mine Cars
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mixing Machines
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Railroad
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Roll Neck—Anti-Friction & Plain
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Tipple & Cleaning
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco; Shell Bldg., St. Louis, and 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
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Texas Company, The, 135 East 42nd St., N. Y. C.
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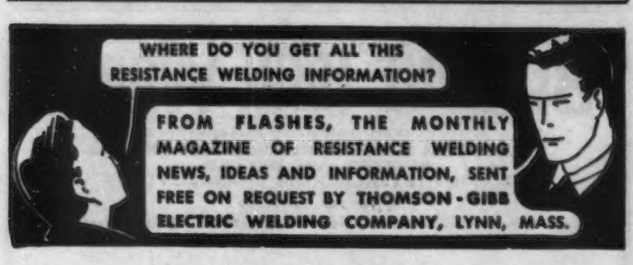
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MANGANESE METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

MANHOLE FITTINGS AND SADDLES
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MONEL METAL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

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Century Electric Co., St. Louis, Mo.
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Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

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Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

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Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

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Parker-Kalon Corp., 196 Varick St., N. Y. C.

OIL & GREASE SEALS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL RETAINERS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES
Carborundum Co., The, Niagara Falls, N. Y.
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OILS—Cutting
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
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Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

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OXYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.

PACKING—Hydraulic
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

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Midland Paint & Varnish Co., The, Cleveland.

PAINT STICKS
Helmer & Staley, Inc., Chicago, Ill.

PERFORATED METAL
Chicago Perforating Co., 2440 W 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Mesta Mch. Co., Pittsburgh.

PICKLING TANK LININGS
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Keagler Brick Co., Steubenville, Ohio.

PICKLING TANK STEAM JETS
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Durion Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PIG IRON
Bethlehem (Pa.) Steel Co.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Republic Steel Corp., Cleveland, Ohio.
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Superior Charcoal Iron Co., Grand Rapids, Mich.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

PIG IRON—Charcoal
Superior Charcoal Iron Co., Grand Rapids, Mich.

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National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

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Jones & Laughlin Steel Corp., Pittsburgh.

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PINIONS—Wire and Rod
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PINS—Cotter
Lamson & Sessions Co., The, Cleveland.

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PIPE—Hammer Welded
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.
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Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

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Crane Co., Chicago.

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Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric
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Republic Steel Corp., Cleveland, Ohio.

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Merrell Mfg. Co., Toledo.
Murchey Machine & Tool Co., Detroit.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PLANERS
Cincinnati (Ohio) Planer Co.

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PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS — Laminated or Molded Phenolic
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded
Bakelite Corp., 247 Park Ave., N. Y. C.
Haveg Corporation, Newark, Delaware.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATFORMS—Skid
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

POLISHING & BUFFING MACHINES—Automatic
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POLISHING MACHINES—Belt
Production Machine Co., Greenfield, Mass.

POTS—Lead, Cyanide or Carbon
Electro Alloys Co., Elyria, Ohio.

POWER UNITS—Rotary
Cushman Chuck Co., Hartford, Conn.
New Departure Div., General Motors Corp., Bristol, Conn.

POWER UNITS—Straight Line
Cushman Chuck Co., Hartford, Conn.

PRECIPITATORS—Electrostatic Dust
Pangborn Corporation, Hagerstown, Md.

PRESS FEEDS—Automatic
Littell, F. J., Mch. Co., Chicago.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Crosby Co., The, Buffalo, N. Y.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Whitehead Stamping Co., 1660 W. Lafayette Blvd., Detroit, Mich.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Baling, Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Galland-Henning Mfg. Co., Milwaukee.

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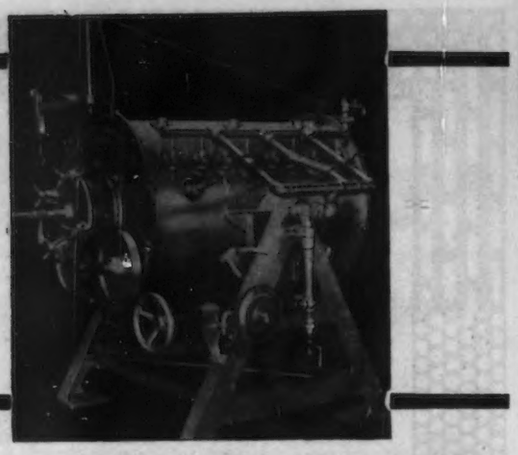

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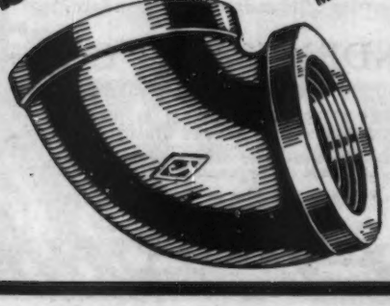

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PRESSES—Coining
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Drop—See Hammers—Drop

PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.
Niagara Machine & Tool Works, Buffalo, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

PRESSES—Forging
Ajax Mfg. Co., The, Euclid, Ohio.
Hydraulik Gmbh, Duisburg, Germany.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.

PRESSES—Forming and Bending
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
U. S. Tool Co., Inc., Ampere, N. J.

PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Farquhar, A. B., Co., Ltd., York, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hanniffin Mfg. Co., Chicago.
Hydraulik Gmbh, Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Oilgear Co., The, 1311 W. Bruce, Milwaukee.
Wood, R. D., & Co., Philadelphia.

PRESSES—Power
Baird Mch. Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyman, Joseph, & Sons, Phila.
Manville, E. J., Mch. Co., Waterbury, Ct.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., The, Southington, Conn.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
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U. S. Tool Co., Inc., Ampere, N. J.
Y & O Press Co., Hudson, N. Y.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Trimming
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.

PULLEYS—Vacuum Cup
Vacuum Cup Metal Pulley Co., Inc., Detroit, Mich.

PULVERIZERS
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.
Whiting Corp., Harvey, Ill.

PUMPS—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Haveg Corporation, Newark, Delaware.

PUMPS—Boiler Feed
Aldrich Pump Co., The, Allentown, Pa.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Ruthman Machinery Co., Cincinnati.
Tomkins-Johnson Co., The, Jackson, Mich.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Coolant
Ruthman Machinery Co., Cincinnati.

PUMPS—Electric
Fairbanks, Morse & Co., Chicago.

PUMPS—Hydraulic
Aldrich Pump Co., The, Allentown, Pa.
American Engineering Co., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Fairbanks, Morse & Co., Chicago.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Power
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Rotary Positive, Centrifugal & Turbine
Crane Co., Chicago.

PUMPS—Steam
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Vacuum
Pennsylvania Pump & Compressor Co., Easton, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Excelsior Tool & Mach. Co., E. St. Louis, Ill.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Niagara Machine & Tools Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Thomas Mach. Mfg. Co., Pittsburgh.

PYROMETERS—Indicating
Brown Instrument Co., The, Philadelphia, Pa.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.

RAIL SPLICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Foster, L. B., Co., Inc., Pittsburgh.
Frank, M. K., 480 Lexington Ave., N. Y. C.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

RAILS—Relaying
Hyman-Michaels Co., Chicago.
Iron & Steel Products, Inc., Chicago.
Sherwood, E. C., 50 Church St., N. Y. C.

RAILWAY EQUIPMENT & SUPPLIES
Fairbanks, Morse & Co., Chicago.
Iron & Steel Products, Inc., Chicago.

REAMERS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

REAMING MACHINES
Blanchard Machine Co., The, Cambridge, Mass.

RECORDERS—Furnace Atmosphere
Brown Instrument Co., The, Philadelphia, Pa.

REELS—For Coil Stock
Littell, F. J., Mch. Co., Chicago.

REFRACTORIES
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Cleveland (Ohio) Quarries Co., The.
Illinois Clay Products Co., Joliet, Ill.
West Virginia Fire Clay Mfg. Co., Pittsburgh.

REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

REINFORCEMENT FABRIC—Concrete
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

RETORTS—Alloy
Electro Alloys Co., Elyria, Ohio.

RIDDLES—Foundry
Ludlow-Saylor Wire Co., St. Louis, Mo.

RINGS—Iron or Steel
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

RINGS—Welded
American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY
Acme Machinery Co., Cleveland.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

RIVET SETS
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

RIVETING MACHINES
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Hanniffin Mfg. Co., Chicago.
Shuster, F. B., Co., The, New Haven, Ct.

RIVETS
Blake & Johnson Co., The, Waterville, Ct.
Clark Bros. Bolt Co., Millidale, Conn.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

RODS—Aluminum
Aluminum Co. of America, Pittsburgh.

RODS—Brass
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave. Midland, Mich.

RODS—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Seymour (Conn.) Mfg. Co.

RODS—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

Products Index

RODS—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Una Welding, Inc., Cleveland, Ohio.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

RODS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Cold Metal Process Co., The, Youngstown, Ohio.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pitgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Ct.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Fdry. Co., Avonmore, Pa.
Standard Machinery Co., Providence, R. I.
United Engineering & Fdry. Co., Pitgh.
Waterbury (Ct.) Farrel Fdry. & Mch. Co. The.

ROLLING MILLS—Copper Rod & Sheet
Torrington (Conn.) Mfg. Co., The.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Kane & Roach, Inc., Syracuse, New York.
Lake Erie Engineering Corp., 68 Kenmore Sts., Buffalo, N. Y.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Rubber Covered
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

ROLLS—Sand Chilled Iron and Steel
Aetna-Standard Engineering Co., The Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mackintosh-Hemphill Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engineering & Fdry. Co., Ptgh.

ROLLS—Special Hardened
Midvale Co., The Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Johns-Manville Corp., 22 East 40th St., New York City.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Iron and Steel
Inland Steel Co., Chicago.

ROOFING & SIDING—(Zinc)—Corrugated & Plain
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ROOFING MATERIALS
Carey, Philip, Co., The, Cincinnati.

RUBBER LININGS
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Richardson Co., The, Melrose Park, Ill.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Midland Paint & Varnish Co., The, Cleveland.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

RUST REMOVING
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Panghorn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O.-Snow Co., The, Cleveland.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.
Peerless Mch. Co., Racine, Wis.

SAWING MACHINES—Metal-Band
Continental Machine Specialties, Inc., Minneapolis, Minn.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.
Wells Mfg. Corp., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff
Atkins, E. C., & Co., Indianapolis.

SAWS—Friction
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades
Atkins, E. C., & Co., Indianapolis.
Peerless Mch. Co., Racine, Wis.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.

SCALES
Exact Weight Scale Co., Columbus, Ohio.
Fairbanks, Morse & Co., Chicago.
Streeter-Amet Co., Chicago.

SCREENS—Perforated Metal
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Ludlow-Saylor Wire Co., St. Louis, Mo.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven.
Houde Engineering Corp., Buffalo, N. Y.
Metal Electric Processing Co., The, Toledo, Ohio.
National Acme Co., The, Cleveland.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Peck Spring Co., The, Plainville, Conn.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic
Brown & Sharpe Mfg. Co., Providence, R. I.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW MACHINERY—Hand
Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle
Acme Machine Tool Co., Cincinnati.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW PLATES
Greenfield (Mass.) Tap & Die Corp.

SCREW STOCK
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Cleveland (Ohio) Cap Screw Co., The.
Lamson & Sessions Co., The, Cleveland.
National Acme Co., The, Cleveland
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Coach or Lag
Lamson & Sessions Co., The, Cleveland.

SCREWS—Machine
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.
Progressive Mfg. Co., The, Torrington, Ct.

SCREWS—Safety Set
Progressive Mfg. Co., The, Torrington, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
Cleveland (Ohio) Cap Screw Co., The.
National Acme Co., The, Cleveland.
Ottemiller, Wm. H., Co., Inc., York, Pa.

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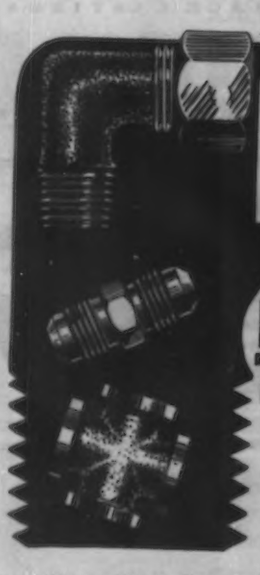

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Ryerson, Jos. T. & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
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Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Chrome Nickel
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Inland Steel Co., Chicago.

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Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.

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Amer. Spring & Mfg. Corp., Holly, Mich.
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STAMPINGS OR DRAWINGS—Metal
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Central Iron & Steel Co., Harrisburg, Pa.
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
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Worcester (Mass.) Stamped Metal Co.

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Wickwire Brothers, Cortland, N. Y.

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Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

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Latrobe (Pa.) Electric Steel Co.
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STEEL—Drill
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Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.
Rustless Iron & Steel Corp., Baltimore, Md.
Ryerson, Jos. T., & Sons, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Superior Steel Corp., Grant Bldg., Pittsburgh.
Union Drawn Steel Co., Massillon, Ohio.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad
Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The Cleveland.
Darwin & Milner, Inc., Cleveland
Disston, Henry, & Sons, Inc., Philadelphia.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Milne, A., & Co., 745 Washington St., N. Y. C.
Ryerson, Jos., T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Windau Steel Co., Cleveland.

STEEL—Tool, Special Shapes
Forging & Casting Corp., The, Ferndale, Mich.
Latrobe (Pa.) Electric Steel Co.

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Latrobe (Pa.) Electric Steel Co.

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STEEL PLANTS AND ROLLING MILLS
Brassert, H. A., & Co., Chicago, Ill.

STEEL ROLLS
United Engineering & Fdry. Co., Ptgh.

STOKERS
Babcock & Wilcox, The, 85 Liberty St., New York City.
Whiting Corp., Harvey, Ill.

STOPS—Crane Limit
Electric Controller & Mfg. Co., The, Cleveland.

STRAIGHTENING MACHINES—Bar & Tube
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Kane & Roach, Inc., Syracuse, New York.
Medart Co., The, St. Louis, Mo.

STRAIGHTENING MACHINES—Wire
Kane & Roach, Inc., Syracuse, New York.

STRUCTURAL IRON AND STEEL WORK
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Bethlehem (Pa.) Steel Co.
Morgan Engineering Co., The, Alliance, O.

STRUCTURAL STEEL — See Angles, Beams, Channels and Tees

STUDS
Erie (Pa.) Bolt & Nut Co.

SUB PRESSES
U. S. Tool Co., Inc., Ampere, N. J.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWAGING MACHINES
Standard Machinery Co., Providence, R. I.
Torrington (Conn.) Company.

SWITCHES—Electric
Westinghouse Elec. & Mfg. Co., East Ptgh.

TANK LININGS
Cellcote Co., The Cleveland.
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

TANK LININGS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Alkali Cleaning
Detroit Rex Products Co., Detroit, Mich.

TANKS—Compressed Air, Gas, Oil and Water
Scaife, Wm. B., & Sons Co., Ptgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Iron and Steel
Munroe R., & Sons Mfg. Corp., Pittsburgh.
Scaife, Wm. B., & Sons, Co., Ptgh.

TANKS—Lead Lined
Dietzel Lead Burning Co., Pittsburgh.

TANKS—Pickling
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.
Blaw-Knox Co., Pittsburgh.
Cleveland (Ohio) Quarries Co., The.
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Goodyear Tire & Rubber Co., Akron, Ohio.
Haveg Corporation, Newark, Delaware.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

TANKS—Rubber Lined
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Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Welded
Blaw-Knox Co., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Scaife, Wm. B., & Sons Co., Pittsburgh.

TAPPING MACHINES
Baker Bros. Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
National Automatic Tool Co., Richmond, Ind.

TAPS—Collapsing
Landis Mach. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

TAPS AND DIES
Greenfield (Mass.) Tap & Die Corp.
Landis Mch. Co., Inc., Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

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TELEPHONES—Interior
Screw Machine Products Corp., Prov., R. I.

TERNE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TESTING MACHINES—Ductility
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Hardness
Olsen, Tinius Testing Machine Co., Philadelphia.
Sboro Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

TESTING MACHINES—Impact
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Materials
Baldwin-Southwark Corp., Southwark Div., Phila.
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Spring
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Tensile
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Torsion
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Universal
Olsen, Tinius Testing Machine Co., Philadelphia.

THERMOMETERS
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

THERMOSTATIC—Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

THREAD CUTTING TOOLS—See Die Taps

THREAD ROLLING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

THREADING MACHINES
Eastern Mcsh. Screw Corp., New Haven, Conn.
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Automatic
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Bolt
Murchey Machine & Tool Co., Detroit.

TIE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TIES—BALE
Acme Steel Co., Chicago, Ill.

TIN PLATE
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS—Precision
Starrett, L. S., Co., Athol, Mass.

TOOLS—Safety, Steel Stamp
Cunningham, M. E., Co., Pittsburgh.

TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

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TRAMRAILS—Overhead Systems
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope
Leschen, A., & Sons Rope Co., St. Louis, Mo.

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–COTTER PINS–
WESTERN WIRE PRODUCTS CO.
ST. LOUIS, U.S.A.

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TRANSCRIBING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

TRANSMISSIONS—Hydraulic
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeves Pulley Co., Columbus, Indiana.

TRAPS—Steam
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

TREADS—Safety
American Pressed Steel Co., Phila., Pa.
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Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Norton Co., Worcester, Mass.

TROLLEYS
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Hanna Engineering Works, 1761 Elston Ave., Chicago.

TRUCKS—Dump (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS—Elevating (Power)
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Barrett-Cravens Co., Chicago.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Factory, Hand
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

TRUCKS—Lift (Hand & Foot)
Barrett-Cravens Co., Chicago, Illinois.
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Scoop (Industrial)
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TRUCKS, TRACTORS AND TRAILERS—Industrial
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Baker-Raulang Co., The, 2175 W. 25 St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila., Div., Phila., Pa.

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Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
United Engineering & Fdry. Co., Pitgh.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

TUBES—Boiler
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., Shelby, Ohio.
Pittsburgh (Pa.) Steel Co.
Steel & Tubes, Inc., Cleveland.

TUBES—Copper Alloy
American Brass Co., The, Waterbury, Conn.

TUBES—High Carbon
Ohio Seamless Tube Co., Shelby, Ohio.
Steel & Tubes, Inc., Cleveland.

TUBES—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBES—Stainless Steel
Cleveland (Ohio) Tool & Supply Co., The.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ryerson, Jos., T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.

TUBING—Aluminum Seamless
Aluminum Co. of America, Pittsburgh.

TUBING—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

TUBING—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome
Steel & Tubes, Inc., Cleveland..

TUBING—Open Seam
Steel & Tubes, Inc., Cleveland.

TUBING—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

TUBING—Seamless Steel
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., Shelby, Ohio.
Pittsburgh (Pa.) Steel Co.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Timken Roller Bearing Co., The, Canton, O.
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TUBING—Square and Rectangular
Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel
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Steel & Tubes, Inc., Cleveland.

TUBING—Tinned Brass or Copper
Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned-Steel
Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel
Bissett Steel Co., The, Cleveland.

TUBING—Welded Steel
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Ohio Seamless Tube Co., Shelby, Ohio.
Steel & Tubes, Inc., Cleveland.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBULAR PRODUCTS
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN—Metals & Alloys
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TURBINE-GENERATORS—Steam
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO-COMPRESSORS
Spencer Turbine Co., Hartford, Conn.

TURNTABLES
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNTABLES—Industrial
Canton Fdry. & Mch. Co., Cleveland.

TWIST DRILLS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS
Crane Co., Chicago.

UNIT HEATERS—Electric
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

VALVES—Acid Resisting
Dietzel Lead Burning Co., Pittsburgh.
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

VALVES—Air Blast for Presses
Littell, F. J., Mch. Co., Chicago.

VALVES—Air & Hydraulic Control
Brown Instrument Co., The, Philadelphia, Pa.
Galland-Henning Mfg. Co., Milwaukee.
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Hannifin Mfg. Co., Chicago.
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

VALVES—Gas, Water and Steam
Brown Instrument Co., The, Philadelphia, Pa.
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.
North American Mfg. Co., The, Cleveland.
Wood, R. D., & Co., Philadelphia.

VALVES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Crane Co., Chicago.
Galland-Henning Mfg. Co., Milwaukee.
Wood, R. D., & Co., Philadelphia.

VALVES—(Pressure Seated) Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.

VALVES—Proportioning
Brown Instrument Co., The, Philadelphia, Pa.
North American Mfg. Co., The, Cleveland.

VALVES—Pump, Rubber
Garlock Packing Co., The, Palmyra, N. Y.

VANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

VARNISH—Acid Resisting
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

VISES
Cincinnati (Ohio) Milling Mch. Co., The.
Jarecki Mfg. Co., Erie, Pa.

WASHERS—Iron or Steel
Sessions, J. H., & Son, Bristol, Conn.

WASHERS—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

WASHERS—Lock
American Nut & Bolt Fastener Co., Pittsburgh.
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Eaton Mfg. Co., Massillon, Ohio.
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Washburn Co., The, Worcester, Mass.

WASHING MACHINES—For Metal Parts
Ransohoff, N., Inc., Cincinnati.

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WATER SOFTENERS AND PURIFIERS
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Federal Machine & Welder Co., Warren, Ohio.
Lincoln Electric Co., The, Cleveland.
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Westinghouse Elec. & Mfg. Co., East Ptgh.

WELDING CONTACTORS
Clark Controller Co., The, Cleveland.

WELDING CONTACTS—Resistance
Electrolov Co., Inc., 50 Church St., New York City.

WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Electric Arc
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General Electric Co., Schenectady, N. Y.
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Hobart Bros., Troy, Ohio.
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Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WELDING MACHINES—Electric Arc, Second-Hand. (See Clearing House Section)

WELDING MACHINES—Flash
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Press
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.

WELDING MACHINES—Seam
Federal Machine & Welder Co., Warren, Ohio.

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Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Universal Spot & Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.

WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh.

WIRE—Barb
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WIRE—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
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Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
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WIRE—Electric Heat Resisting
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

WIRE—Flat, Round, Square or Special Shapes
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
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WIRE—Insulated
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Roebling's, John A., Sons Co., Trenton, N. J.

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Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Una Welding, Inc., Cleveland, Ohio.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH
Buffalo (N. Y.) Wire Wks. Co., Inc.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.
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WIRE DRAWING MACHINERY—See Wire Mill Mchry. & Equip.

WIRE FORMING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.
U. S. Tool Co., Inc., Ampere, N. J.

WIRE MILL MACHINERY AND EQUIPMENT
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Hindley Mfg. Co., Valley Falls, R. I.
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Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

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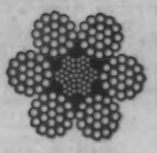
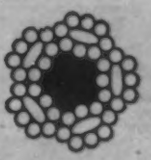

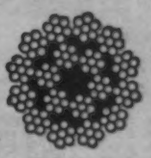

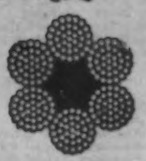

In successful Wire Rope usage construction is a factor quite as important as the proper selection of material.

The accompanying illustrations show cross section views of some of the various constructions we furnish. Every construction is made according to the "Leschen" standard.

If you are experiencing any Wire Rope trouble, probably either the construction or the quality is not suited to your particular work, our Engineering Department will gladly advise with you, without putting you under any obligation.

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5" Newton Portable
4½" Hamilton Floor Type
3½" Rochester Floor Type
3" No. 2 Rochester
3" No. 3A Universal
2½" No. 1 Cleveland

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24", 36" Bullard "New Era"
42" Bullard "New Era"
30", 52", 62" King
48", 54", 60" Colburn

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1, 2, 3, Spdl. Lel. Gifford
4, 6 spdl. Lel.-Gifford
1, 2, 3, 4, 6 spdl. Henry & Wright
32" Cinn. Bickford
No. 210 Barnes, 3 spdl.
No. 2 Colburn, 1, 2 spdl.
No. 2 Colburn, 3, 4 spdl.
No. 3—24" Defiance
Nos. 121, 314, 513 Baker
No. 25—36" Foote-Burt
No. 2 Western Multiple
No. 14 Natco Multiple
No. 4 Baush Multiple

RADIALS
4' American Plain
5' American Full Univ.
5' American Triple Purpose
6' American Triple Purpose
6' Cinn. Bickford Univ.

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No. 16-HS G. & E.
No. 3—28" B. & S.
No. 4—48" B. & S.
No. 6—60" B. & S.
No. 2—60" Goss Hobber
No. 6—72" B. & S.
Nos. 6, 61, 62 Fellows
Nos. 65, 615, 625 Fellows
96" Newton, M.D.

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26"x168" Landis Plain
26"x96" Landis Plain
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No. 13 B. & S. Univ.
12"x66" Landis Univ.
No. 1½ Landis Int.
No. 70 Heald Int.
No. 10 Blanchard
No. 16-A Blanchard
Landis Crankpin Grdr.
16" Arter Rotary Surf.
14"x36" P. & W. Surf.
Norton Open Side Surface

LATHES
14"x 6' Lodge & Shipley
14"x 8' American
16"x 6' American
16"x 8' Lodge & Shipley
18"x 8' Lodge & Shipley
18"x10' Reed-Prentice
20"x 8' American
20"x 8' Lodge & Shipley
20"x14' L. & S. Grd. Hd.
22"x12' Lodge & Shipley
24"x12' L. & S. Grd. Hd.
26"x14' LeBlond Crank
30"x11' American Grd. Hd.
36"x30' Rahn-Larmon
54"x23' Johnson
66"x21' Putnam

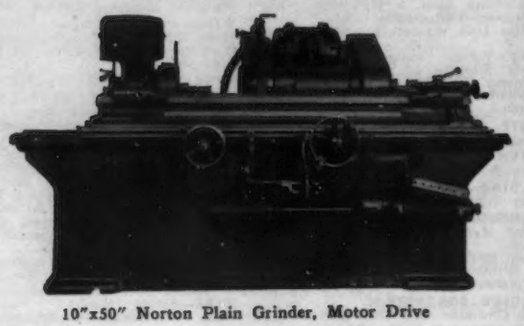
MILLERS
No. 24 Hvp. Ohio
No. 2-B K. & T. pl., M.D.
No. 2-B, No. 3-B B.&S. pl.
No. 3-B Milwaukee, Pl.
No. 2, No. 3 Cinn. pl.
No. 4-B B. & S. Plain
No. 4 Cincinnati plain
No. 1½ B. & S. Univ.
No. 2 B. & S. Univ.
No. 4 Cinn. Univ.
No. 2, No. 3 Cinn. Vert.
No. 3-B Milwaukee Vert.
No. 5-B, No. 6 Becker
18" & 24" Cinn. Duplex
No. 5 Cincinnati Hydro.
6"x14" P. & W. Thread
6"x48" P. & W. Thread
Hanson-Whitney Thread

PLANERS
24"x24"x 6' American
30"x30"x 6' Gray
30"x30"x14' Gray
36"x36"x 8', 12' Cincinnati
44"x36"x16' Gray
42"x42"x30' Niles-Bement-Pond. Arr. Rev., M.D.
48"x48"x10' D. & H., O.S.
48"x48"x16' N-B-P
60"x48"x16' Gray
60"x48"x20' Hamilton
72"x60"x16' American

SHAPERS
16" Walcott
16" Stockbridge
24" Gould & Eberhardt

TURRET LATHES
No. 4 W. & S. Univ.
No. 1-A W. & S.
No. 2-A W. & S.
No. 3 Cinn.-Acme
No. 3-A W. & S. Tim. Brg.
No. 4-A W. & S. 7¾" H. S.
No. 4-L Gisholt

GRINDERS
NORTON MOTOR DRIVEN
FULLY GUARANTEED



10"x50" Norton Plain Grinder, Motor Drive

THESE SIZES IN STOCK:

6"x32"	10"x50"	14"x50"
10"x18"	10"x72"	14"x72"
10"x24"	10"x96"	14"x96"
10"x36"	14"x36"	16"x50"
18"x96"		18"x144"

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10" Bullard Continumatic
Nos. 454 & 654 New Britain
14" Fay chucking
1½" Cleveland 4 spindle
⅜", 1½", 1¾" & 3¼" Gridley
1", 1⅝", 2" & 2¼" Acme 4 spindle

DRILLS
21", 24" & 28" Cincinnati
Nos. 216, 217, 315 & 321 Baker
20", 22" & 24" Barnes all geared
3½', 4', 5', 6' & 8' Western radial
Nos. 11, 12, 13, 14 & 30 Natco multiple
Nos. 1, 2 & 3 Avey sensitive

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Nos. 18H & 24H Gould & Eber. hobbers
No. 12 Barber Colman hobbers
Nos. 1 & 5A Lees Bradner hobbers
Nos. 6 & 715 Fellows shapers
11" Gleason bevel generator
36" Newark automatic spur

GRINDERS
No. 4 Brown & Sharpe universal
No. 16 Blanchard rot. surface
12"x24" & 16"x48" Diamond surface
No. 2 Cincinnati centerless
No. 72-A-3 Heald Sizematic
18", 24" & 30" Gardner disc

LATHES, ENGINE
14"x6' American geared head
15"x6' Sebastian geared head
16"x6' Pratt & Whitney geared head
16"x8' & 16"x10' Lodge & Shipley grd. hd.
21"x18' LeBlond heavy duty
27"x12' Schumacher Boye

LATHES, TURRET
Nos. 4, 6 & 3A Warner & Swasey
24" Bullard vertical
21" & 24" Gisholt
18" Libby
Nos. 3 & 4 Foster
2¼" & 3" Jones & Lamson

BORING MILLS
30" Bullard single turret
34" Colburn single turret
36" Niles car wheel
42" Detrick & Harvey
60" Gisholt
100" Betts

PRESSES
600 Ton Cleveland coining
Nos. 1½B & 5A Bliss toggle
No. 266 Consolidated cam draw
No. DDG54 Ferracute cam draw
Nos. 64 & 65 Consolidated
Nos. 55½, 56 & 56½ Toledo
No. 75 Toledo geared
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60" LATHE, Pittsburgh QCG, 60"x18' bed; arr. D. C. Motor Drive.
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10'x12 Ga. DRIES & KRUMP Leaf POWER BENDING BRAKE, arr. M.D.
10'x16 Ga. OHL POWER SQUARING SHEAR; Screw Type Back Gauges.
16'x¼" cap TOLEDO GAP POWER SQUARING SHEAR, No. 500¼H.
1000 Ton Ferracute No. E56 COINING PRESS, up-moving Ram.
400 Ton Hydraulic Press, Platen Area 50"x96"; 4-12" Rams; 20" Stroke; 2500# Pressure; Steam Platens; Adamson make.
900# Miner & Peck Drop Hammer, automatic belt, also 400#.
26"x7½" LIBBY-International Turret Lathe, Type C, 7½" Hole. M.D.

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36" Bullard New Era Type cutting lubricant system, 3-jaw chuck table, MD.
No. 16 Blanchard Vertical Surface Grinder, 20 HP, 60 cycle motor on spindle.
16" Gould & Eberhardt Shaper, cone drive.
24" Gould & Eberhardt Shaper, gear box AC drive.
26" Lynd-Farquhar Openside Shaper, MD.
18" x 8' Springfield GH Lathe, arr. for MD.
No. 1 Kempsmith Universal Miller, full equipment.
No. 3 Thiel Filing & Sawing Machine.
4-spindle Allen Drill, power feed to each spindle, MD.

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80 Spindle Hill Drill No. 1-F equipped with 80 No. 3 M. T. heads and 25 No. 5 M. T. heads adjustable for center distance on the rail; 26' between housings; motor driven. Write for full specifications and photograph.

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Drexel 3300.

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NEW 1930 Capty. 1-3/4" x 7"

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3"x36" Jones & Lamson, arrg. for chucking.
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76"x76"x14' Niles-Bement-Pond Planer
No. 70 Heald Grinder, M.D., excellent condition

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752 cu. ft. 16"x9¾"x10" Sullivan Class WN3. Motor Driven. 100 lb. Air Pressure
868 cu. ft. 17"x10¼"x12" Sullivan Class WN31. Motor Driven. 100 lb. Air Pressure

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Logemann Hydraulic, Complete with motor driven pump. Size of Bale 4"x4"x11"
Logemann Double Hydraulic, Complete with Pump. Size of Bale 12"x9"x5"

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10' Ryerson-Kling, Belt Driven. Capacity ⅛"
12' N-B-P, Motor Driven. Capacity 1⅛"
14' Bertsch No. 7, Motor Driven. Capacity 3/16"
30' Hilles & Jones, Motor Driven. Capacity 1"

BRAKE—LEAF TYPE
8' Dreis & Krump No. 184, Belt Driven. Capacity 10 ga.
10' Dreis & Krump No. 203, Motor Drive. Capacity 12 ga.
12' Dreis & Krump No. 226, Motor Drive. Capacity ¼"

BRAKE—PRESS TYPE
10' Geo. A. Ohl, Belt Motor Dr. Capacity ¼"

BORING MILL—HORIZONTAL
4" bar Toledo, Floor Type, Motor Driven. QCG

FORGING MACHINES
2½" to 5" National, Ajax, Acme Steel Frame

GRINDER
No. 3 Gardner Duplex Wet Tool Grinder. Complete with 2 each Universal Lever Feed Tables, Hoods, Protractors, etc. (Never used)

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Chambersburg, Niles-Bement-Pond, Erie and Billings & Spencer 1200 lb. to 12,000 lb.

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No. 5A High Speed, Motor Driven. Capacity ⅜" to ½" Cone, Round and Oval Heads

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90" Niles-Bement-Pond Double End Driving Wheel Lathe. Complete with 50 & 10 H.P. Motors

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120"x84"x18' Betts Double Housing, Four Head
72"x72"x16' Cincinnati, Four Head

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74" Hilles & Jones, Arranged for Motor Drive. Capacity ¼" Plate, Hold-downs
10' Geo. A. Ohl, Grd., Belt Dr., Cap. 3/16" Plate

19 OVERHEAD ELECTRIC TRAVELING CRANES ALL IN ONE PLANT
Various Makes, Capacities and Spans. Complete with 230 Volt D.C. Motors and Controls. Single and Double Hook. Single and Double Trolleys. Building to be dismantled and Cranes must be removed before November 30. Priced low for immediate disposition. All are in first class operating condition.

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No. 96G Toledo, 148" Between Uprights, 24" Str.
No. 59¼ Toledo, 40" Between Uprights, 6" Str.
800 ton Hamilton, 40" Between Uprighst, 8" Str.
No. 78½ Bliss, 36" Between Uprights, 10" Str.
No. 304 Bliss, 18" Between Uprights, 4" Str.

PRESSES—TOGGLE DRAWING
No. 412 Bliss, Area of Bed 56"x36", Stroke of Blankholder 15", Stroke of Plunger 22"
No. 268¼ Toledo, Area of Bed 60⅛"x34", Stroke of Blankholder 13½", Stroke of Plunger 29"
No. 1018 Bliss, Area of Bed 72"x60", Stroke of Blankholder 12", Stroke of Plunger 24", 1500 ton Ram Pressure
No. 16 Bliss, Area of Bed 54"x54", Stroke of Blankholder 16", Stroke of Plunger 24"

PRESS—HYDRAULIC FORGING
1200 ton Southwark Four Column Hydraulic Forging Press. Complete with Slip Ring Motor Drive direct connected to Triplex Hydraulic Pump, Intensifier, High Pressure Piping and Valves.

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1¼"x8" Worthington Vertical Triplex Hydraulic. Capacity 8 GPM. 2500 lbs. pressure
2"x12" Deane Horizontal Duplex Hydraulic. Capacity 32.64 GPM. 2500 lbs. pressure
3"x18" Worthington Horizontal Duplex Hydraulic. Capacity 125 GPM. 2000 lbs. pressure
3⅛"x12" Worthington Horizontal Duplex Hydr. Capacity 150 GPM. 1500 lbs. pressure
5½"x10" Deane Vertical Triplex Hydraulic. Capacity 165 GPM. 400 lbs. pressure
5"x12" Aldrich Vertical Triplex Hydraulic. Capacity 150 GPM. 1500 lbs. pressure

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8 "x 4½" Blake & Johnson Single Stand Two High
4 "x 5 " Torrington Single Stand Two High
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8¼"x10 " Belgian Three Stand Two High Train
9 "x10 " Columbia Two Stand Two & Three High
9 "x14 " Cramp Single Stand Two High
9 "x14 " Columbia Two Stand Two & Three High
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8' Morgan, Motor Driven. Capacity 1" Plate

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Garrison Bar Shear, Arranged for Motor Drive. Length of Blade 9 1/16". Capacity 5" Rounds

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Bliss, Belt Driven. Capacity ⅛"
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No. 36-G Yoder, Motor Driven. Capacities 5 cuts 11 ga., 11 cuts 14 ga., 15 cuts 16, 18, 20, 22 and 24 gauge

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No. 3 Baird Four Slide Wire Forming Machine

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1— " 452 " "
1— " 454 " "
1— " 33 " "
1—4¼ Model L, S. S. Gridley
1—9/16 " G " "
1—1½ " GA " "
2—4" Model H, Gridley Chuckers
1—2¾" " A, Cleveland
1—⅞ " A, "
1—⅝ " A, "
1—⅝ " B, "
4—Four Spindle Cleveland Nut Machines

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1—72" N-B-Pond Vertical
1—62" N-B-Pond Vertical
1—53" N-B-Pond Vertical
1—60" Colburn Vertical
1—60" Cincinnati Vertical
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1—36" Bullard Rapid Production

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1—100" x 50' N-B-Pond, M.D.
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1— 36" x 26' Lodge & Shipley
1— 30" x 18' Houston-S-Gambel
1— 26" x 20' Sidney, Gearod Head

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1—42" x 42" x 22' Cincinnati, M.D.
1—36" x 36" x 14' Gray, M.D.

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1— 72" Cincinnati type G Cutter
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1—No. 24 Gardner Disc
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GRINDERS, No. 13 Br. & S. Univ. (3)
GRINDER, Pratt & Whitney Surface, Ball Brg., M.D.
GRINDERS, No. 70 Heald, Internal (3)
GRINDER, No. 70 Heald Duplex, Double Spindle

4—No. 72 HEALD INTERNAL GRINDERS MOTOR DRIVE HYDRAULIC FEEDS

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GRINDER, No. 2 B. & S. Universal
RADIAL, 3' Amer., Motor on Arm, High Speed
LATHE, 16" Monarch Gd. Hd., T.A.
LATHE, 36"x10' Reed, M.D.
MILLS, Nos. 2 & 3 Brown & Sharpe, Vert., M.D.
MILLS, Nos. 1½A, 2A & 3B Milwaukee
MILL, No. 3GH Hendey Universal, S.P.D.
OIL GROOVER, Wiesse, late type
PLANER, 60"x60"x14' Niles-Bement-Pond
SHAPER PLANER, 24" Cooley Openside
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SHEAR, 10' ½" United Eng'g, M.D.
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12 SPEED GEARED HEAD

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NILES 10' vert.

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PUTNAM 36"x28', grd. head—Nearly New
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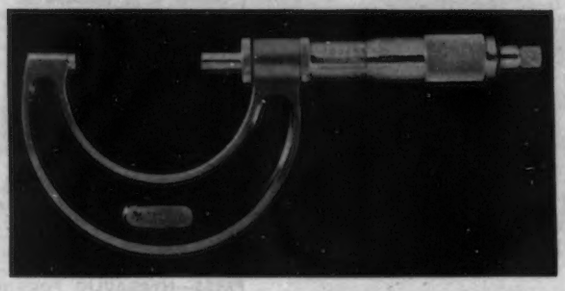

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MACHINERY
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All of this equipment is in first class condition and may be seen in operation on regular production work at our New York Plant.

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12" & 14" Hendey Lathes, T.A., & collets.
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8"—12"—16" Heald Rotary Surface Grinders.
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16—#00G BROWN & SHARPE Full Automatics.

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Excellent machines. Write for prices.

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Bertsch Initial Type, 10'x¼"—3 roll drive.
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Both machines in excellent condition and available for immediate shipment.

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COMPLETE FORGING PLANT

2,500 lb. Chambersburg steam or air combination drop and forging hammer, double frame with 2 sets of flat dies.
Ingersoll-Rand XB compressor 14-9x12, 650 cu. ft. with Condor one piece belt.
75 HP. West. motor CS 220V. 3 ph. 60C. 700 RPM compensator and pulley.
300 cu. ft. receiver. OTHER EQUIPMENT.

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600 TON TOLEDO KNUCKLE JOINT EMBOSSING PRESS
MULTIPLE PUNCH: Long & Allstatter, 350 ton cap. 10 ft. between housings.
DOUBLE ANGLE SHEARS: Kling 6 x 6 x 1"; 8 x 8 x 1".
PLATE PLANER: Hilles & Jones No. 4
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5000 LB. ERIE DOUBLE FRAME FORGING HAMMER.
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No. 3½-B Bliss, will draw and lift out 5½", wt. 21,000 lbs.
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Capacity 1/4" x 12' 6"

Double geared; double crank; tie-rod construction; A-type C.I. end frames; dia. of crankshaft 8½"; length of ram 13½'; width of bed 18"; flywheel 42" x 8½"; complete with 25-HP Westinghouse DC motor and control.

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WILL SELL AT SACRIFICE
MUST MOVE IMMEDIATELY
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10' & 12' SQUARING SHEARS

Made by United Engineering Co.
Capacity 3/16"—1/4"—5/16"
Gap 16—22—30—36

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Complete Continuous
PICKLING UNIT
Conveyor Type

With Drying System, Blower Equipment, Motors and Five Large Tanks:

PRACTICALLY NEW
Offered at fraction of orginal cost.

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1—12" Waterbury Farrel Gang Slitter.
Cutting Capacity: 1/32"-¼" Thickness; ¼"-12" Width with 225 New Cutters 4.482 I.D. by 8.25 O.D. Range of thickness from 7/32"-1", with 25 H.P. Motor and Starter.

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10,000 ft. Link Belt Roller Chain RC 150 1-½" pitch x 15/32" x 15/32".

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1-40 Keg.	Size of Drum	48"	dia. x	60" lg.
1-25 Keg.	" " "	36"	dia. x	56" lg.
1-25 Keg.	" " "	37"	dia. x	49½" lg.
1-10 Keg.	" " "	30"	dia. x	32" lg.

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1-#8 Morgan Keg Heading Machine with 3 H.P.Mtr.

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NUMBER IN STOCK	SIZE	NAME	TYPE	CFM
5	14x12	Ingersoll-Rand	ER-1	528
4	14x12	Chicago Pneumatic	NSB	"
1	14x12	Pennsylvania	3A	"
2	12x12	Ingersoll-Rand	ER-1	386
2	12x12	Gardner		350
1	13x10	Worthington		435
1	12x12x10	Ingersoll-Rand	FR-1	368
3	12x10	Ingersoll-Rand	ER-1	"
4	12x10	Chicago Pneumatic	NSB	"
2	10x10	Ingersoll-Rand	ER-1	254
2	10x10	Chicago Pneumatic	NSB	"
1	9½x10	Worthington	L	236
2	12x 9	Worthington	L	354
1	10x 9	Pennsylvania	3A	240
2	8½x 9	Worthington	L	160
4	12x 8	Ingersoll-Rand	ER-1	311
2	12x 8	Pennsylvania	3A	311
1	10x 8	Ingersoll-Rand	ER-1	215
1	10x 8	American	WP	215
1	9x9x8	Ingersoll-Rand	FR-1	173
3	9x8	Ingersoll-Rand	ER-1	"
1	9x8	Chicago Pneumatic	NSB	"
1	8x8	Chicago Pneumatic	NSB	136
1	9x6	Pennsylvania	3A	153
2	8x6	American	WP	120
3	7x6	Ingersoll-Rand	ER-1	92
4	7x6	Chicago Pneumatic	NSB	"
2	7x6	American	WP	"
2	7x6	Gardner		"

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22" x 8" Ingersoll Rand
Vacuum pump 1050 cu. ft.

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BELTED—176 ft., 355 ft., 540 ft. 676 ft., 752 ft. & 1200 ft.
ELECTRIC—355 ft., 528 ft., 676 ft. 807 ft., 1302 ft., 1728 ft. 2022 ft., 3600 ft. & 5000 ft.
STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft. & 5000 ft.
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All Types and Sizes
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One—Ingersoll Rand Imperial XCB 860 cu. ft. per minute air compressor 100 lbs. pressure belted to 200 H.P. A.C. motor.
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2—400 Amp. Hansen Gasoline Engine Driven Portable Welders.
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1—7½ ton P. & H. Overhead Traveling Crane, D.C. motors, 70 ft. span.
1—350 ft. and 1—500 ft. Ingersoll-Rand E.R.-1 Air Compressors.

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H.P.	MAKE	VOLTS	TYPE	SPEED
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1500	West.	2200	C.W.-Slipring	440
1000	West.	2400	Synch.	900
850	West.	2200	C.W.-Slipring	440
500	Al. Chal.	4000/2300	Slipring	500
450	West.	440/220	Synch.	257
450/360	West.	2200	C.W.-Slipring	875/700
400	G.E.	4150/2300	MT-Slipring	390
375	G.E.	2300	ATI-Synch.	600
350	GR.WH.	2300/440	Synch.	720
300	West.	440/220	C.W.-Slipring	1800
250	G.E.	4000/2300	M.T.-Slipring	257
250	GR.WH.	440/220	1280-Slipring	435
250	West.	440/220	C.W.-Slipring	585
225	Elec. Machry.	4150/2300	3-BRG.-Synch.	450

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	H.P.	Speed	Volts	Make	Price
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1—250 3 ph.	60 cy.	585	440	S.R. C.W.	450
5—15 D. C.		500/1000	550	G.E.	290
2—20 D. C.		500/1000	550	G.E.	340

1—Rock River Punch 48" Throat, Architectural Jaw. Price 850
1—50-Ton Industrial Bay City Wreck Crane 4,500
1—20-Ton Browning Loco. Crane..... 4,000
1—25-Ton Industrial Bay City Loco. Crane 5,000
1—20-Ton McMyler Loco. Crane..... 4,000
1—15-Ton Browning Loco. Crane..... 3,500
1—15-Ton Morgan Bridge Crane 68' Span
1—10-Ton Toledo Ore Crane 1½ yd. Bucket 60' Span

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Bertsch 156" Shear, ¼"—16" Gap, A.C. Motor. Excellent.

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10-ton Chesapeake	45' 0" span,	220-V.A.C.
20-ton Northern	65' 0" span,	230-V.D.C.
3-ton Chesapeake Gantry	50' 0" span,	220-V.A.C.

10—Shepard Electric Hoists, ½- to 5-ton cap. A.C. & D.C.

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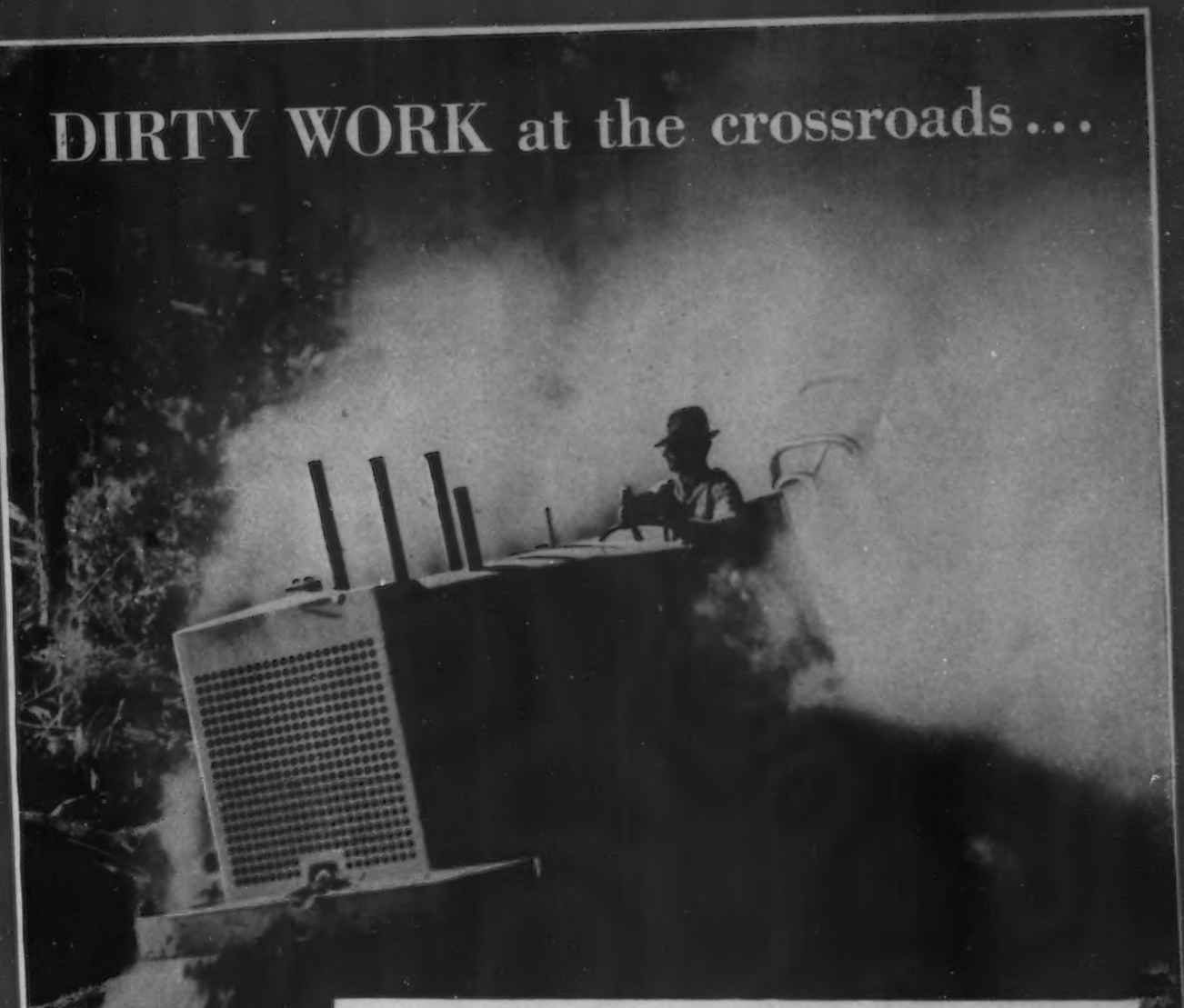

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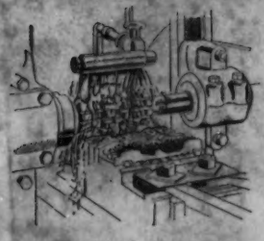

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